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DR. GEORGE EDMONSON,  
Mayor of Clinton, Ill.

PROCEEDINGS OF THE  
Thirty-Fifth Annual Meeting  
OF THE  
Illinois State Dairymen's  
Association

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HELD AT  
CLINTON, ILLINOIS,  
January 19, 20 and 21, 1909,

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## Letter of Transmittal.

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Office of Secretary,  
Illinois State Dairymen's Association,  
Chicago, Ill., 1909.

To His Excellency, Charles S. Deneen, Governor of the State of  
Illinois:

I have the honor to submit the official report of the Illinois  
State Dairymen's Association, containing the addresses, papers,  
and discussions at its thirty-fifth annual meeting, held at Clinton,  
Illinois, January 19, 20, 21, 1909.

Respectfully,

GEO. CAVEN, Secretary.

30 Jan 25 dir. g. v. 35. 1909  
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## **List of Officers.**

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President—

L. N. WIGGINS, Springfield.

Vice President—

J. P. MASON, Elgin.

Directors—

J. P. MASON, Elgin.

CHAS. GILKERSON, Marengo.

A. F. JANSEN, Effingham.

E. SUDENDORF, Clinton.

CARL E. LEE, Urbana.

L. N. WIGGINS, Springfield.

J. F. SANMANN, Havana.

Secretary—

GEO. CAVEN, Chicago.

Treasurer—

CHAS. FOSS, Cedarville.

## **By-Laws of the Illinois State Dairymen's Association.**

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### **Officers.**

Section 1.—The officers of the Association shall consist of a President, Vice President, Secretary, Treasurer and Board of Directors, composed of seven members, of whom the President and Vice President of the Association shall be members and the President ex-officio Chairman.

### **Duties of the President.**

Sec. 2.—The President shall preside at the meetings of the Association and of the Board of Directors. It shall be his duty, together with the Secretary of the Board of Directors to arrange a program and order of business for each regular annual meeting of the Association and of the Board of Directors, and upon the written request of five members of the Association it shall be his duty to call special meetings. It shall be his further duty to call on the State Auditor of Public Accounts for his warrant on the State Treasurer, for the annual sum appropriated by the Legislature for the use of this Association, present the warrant to the Treasurer for payment, and on receiving the money receipt for the same, which he shall pay over to the Treasurer of the Association, taking his receipt therefor.

### **Duties of the Vice President.**

Sec. 3.—In the absence of the President his duties shall devolve upon the Vice President.

### **Duties of the Secretary.**

Sec. 4.—The Secretary shall record the proceedings of the Association and of the Board of Directors. He shall keep a list of the members, collect all the moneys due the Association (other

than the legislative appropriations), and shall record the amount with the name and postoffice address of the person so paying, in a book to be kept for that purpose. He shall pay over all such moneys to the Treasurer, taking his receipt therefor. It shall also be his duty to assist in making the program for the annual meeting and at the close of the said meeting compile and prepare for publication all papers, essays, discussions and other matter worthy of publication, at the earliest day possible, and shall perform such other duties pertaining to his office as shall be necessary.

#### **Duties of the Treasurer.**

Sec. 5.—The Treasurer shall, before entering on the duties of his office, give a good and sufficient bond to the Directors of the Association, with one or more sureties, to be approved by the Board of Directors, which bond shall be conditioned for a faithful performance of the duties of his office. He shall account to the Association for all moneys received by him by virtue of said office and pay over the same as he shall be directed by the Board of Directors. No moneys shall be paid out by the Treasurer except upon an order from the Board, signed by the President and countersigned by the Secretary. The books or accounts of the Treasurer shall at all times be open to the inspection of the members of the Board of Directors, and he shall, at the expiration of his term of office, make a report to the Association of the conditions of its finances, and deliver to his successor the books of account together with all moneys and other property of the Association in his possession or custody.

#### **Duties of the Board of Directors.**

Sec. 6.—The Board of Directors shall have the general management and control of the property and affairs of the Association, subject to the By-Laws.

Four members of the Board shall constitute a quorum to do business.



The Board of Directors may adopt such rules and regulations as they shall deem advisable for their government, and may appoint such committees as they shall consider desirable.

They shall also make a biennial report to the Governor of the State of the expenditures of the money appropriated to the Association, and arrange the program and order of business for the same.

#### **Election of Officers.**

Sec. 7.—The President, Vice President and Board of Directors shall be elected annually by ballot at the first annual meeting of the Association.

The Treasurer and Secretary shall be elected by the Board of Directors.

The officers of the Association shall retain their offices until their successors are chosen and qualify.

A plurality vote shall elect.

Vacancies occurring shall be filled by the Board of Directors until the following annual election.

#### **Membership.**

Sec. 8.—Any person may become a member of this Association by paying the Treasurer such membership fee as shall from time to time be prescribed by the Board of Directors.

#### **Quorum.**

Sec. 9.—Seven members of the Association shall constitute a quorum for the transaction of business but a less number may adjourn.

#### **Annual Assessment.**

Sec. 10.—One month prior to the annual meeting in each year the Board of Directors shall fix the amount, if any, which

may be necessary to be paid by each member of the Association as an annual due.

Notice of such action must be sent to each member within ten days thereafter, and no member in default in payment thereof shall be entitled to the privileges of the Association.

**Amendment of By-Laws.**

Sec. 11.—These By-Laws may be amended at any annual meeting by a vote of not less than two-thirds of the members present. Notice of the proposed amendment must be given in writing, and at a public meeting of the Association, at least one day before any action can be taken thereon.

**PROCEEDINGS**  
**OF THE**  
**Thirty-Fifth Annual Convention**  
**OF**  
**Illinois State Dairymen's Association**  
**HELD AT**  
**Clinton, Illinois, January 19, 20 and 21, 1909.**

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The Illinois Dairymen's Association met in annual session at the Court House, in Clinton, Illinois, January 19, 1909, at 10:30 A. M. President L. N. Wiggins in the chair.

By the President:—We will come to order on this our 35th annual meeting. It is a number of years older than I am, but I expect there are some men here who attended the first meeting. I am sure Mr. Lumbard did and there must be others.

For the benefit of strangers at our meetings, I wish to state the object of this association. We are banded together, as most associations are, for the general distribution of dairy knowledge. We have no political axes to grind. There are no salaries con-

nected with the association, and we meet where we think we can spread the gospel of the dairy cow and do the most good.

The membership fee is one dollar and you are all invited to join. It costs money to spread this dairy information throughout the state, and to hold meetings. We have an appropriation from the state legislature of \$2500.00 to help defray the expenses. We used to get \$1500.00 until two years ago, when they raised it to the present amount, and I hope our legislative committee will try to get the same amount this year with the promise of more.

I wish to thank the citizens of Clinton for their hearty support in helping Mr. Sudendorf to hold this meeting. I wish to thank the Mayor and his officers in connection with the government of the city for their generous welcome.

We will have a three day session here, and have endeavored to have men on this program who are experts in their line. We have not very many speakers, but all are good. They are men who are posted, and men who know what they are talking about in a practical way. I hope every man here will try to attend these meetings if he owns a farm, or is in the dairy business, or corn growing business. He cannot afford to miss these meetings. While it is not always the number we need to make a meeting successful, still we want to make a good showing, and I am satisfied that the farmers of this locality have a treat in store for them. If those who are here will kindly say a word to the neighbors and get them all here in the next two days, I am sure they will be pleased to have made the effort. I know we are here in the corn belt, but the old dairy cow has come in, and we want to teach you not to ship in milk from outside to supply the local demand.

I will now call on Rev. M. Flagg to open this convention with prayer.

## PRAYER.

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ByRev. M. Flagg, Clinton, Ill.

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Mr. Chairman, a word before prayer. Gentlemen:—I do not want to make a speech, simply want to state to you a reason why it is very appropriate for you to open this meeting with prayer. There is a relation on your part to that lower life of the animal world that is just as mysterious as ours. In taking as good care of your cattle as you can, for profit—for that is what you are aiming at first—there is that element of justice, element of mercy, element of kindness that enables one in their relation to these lower forms of life, to approach to near the Master's standard. It is the same in my business, dealing with the souls of men, only mine is from a different standpoint. You are doing the Master's work as well as I am. There is a peculiar appropriateness in opening your session with prayer.

Please rise while we pray.

Our Heavenly Father we thank Thee for this good land of ours. We thank Thee for its intelligence and enlightenment and spirit of progress. We thank Thee for the encouragement and guidance in every form of industry.

Our Heavenly Father, we praise Thee that as these persons are gathered here to discuss those things of interest to themselves, they come in the name and in the spirit of our Lord, Jesus Christ,

We praise Thee, Our Father, that as they seek the profits Thou hast indeed provided for them in these material things, they can also be doing the work of our Lord.

We thank Thee that Thou hast placed man in a high position and made him master over these things. We thank Thee for the material things and for all the beasts of the field, for

everything upon the earth. Thou hast exalted him next to the angels in Thine own estimation.

In this work, these men do what they can, and indeed are carrying out the spirit of the Golden Rule, and showing mercy for his beast. The man that lives the mortal life can also live the Golden Rule, and show mercy to his human friends, as well as his dumb brutes. The spirit of the Golden Rule is also carried out in the progress of this association, and in the progress of all the work of the farm. All their work is toward the better health of the country, the better intelligence of all.

They are seeking to teach the farmer how to better his profits so it will be better for the consumer and the producer, so that each shall be drawn nearer together and less of discontent and greater prosperity.

We praise Thee for these things, and may Thy blessing rest upon these men gathered here together, and help them in the work they have to do, in the plans, in the legislature and everything they undertake. May it all prosper by Thy spirit and Thy counsels.

We ask Thee, Our Heavenly Father, that they may glorify this work one to another, and may Thy blessing be on all who come together. May they glorify Thy name, and as this association advances in its work, and advance the material interests of our country, we may direct our services here, and in every other field of labor, and all professions and all occupations and all our powers unto Him, who hast given all to us, and glorify His name, and make us worthy of a better world and a better occupation. This we ask for Jesus Christ's sake. Amen.

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By the President:—We have the honor to have with us this morning, the Mayor, who will give us the address of welcome.

## ADDRESS OF WELCOME.

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By

Mayor Edmonson, Clinton, Ill.

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Mr. Chairman, Gentlemen of the Convention:—It is very far from the scope of my work to be making speeches. However, there are some things at nearly all times that every man can say. In the first place, we are very proud to have you with us this morning, and to be honored with this convention.

We, the citizens of Clinton, are on the eve of a great development and work, I mean in regard to dairy work. It is especially fitting that you should recognize us at this time by honoring us with your convention here.

We are proud that we have, as one of our citizens, a member of your organization, who has now started a new business in Clinton, a business that is new to us, but not to him. We feel like giving our hearty support to you, and we are glad you have recognized him, and in so recognizing him, you have recognized us also.

There are many things that could be said along the line of dairying and dairy products, but it is simply my province, as Mayor of this city, to extend to you a hearty welcome, and we hope you will be able to make use of our city for everything for your comfort and benefit while you are here.

By the President:—We will now have a song from Mr. Jules Lumbard, who has attended all these conventions from the first, 35 years.

By Mr. Lumbard:—I wish I could have permission to say how delighted I am to be here. It is good to meet old friends, like coming home, until I have to go away again. In fact, when I apply for transportation, I only take it one way now. I go back the way I can. I am like the man who died in Omaha 18 or 19 years ago. He went to heaven and asked permission of St. Peter to go in. He asked on what grounds. "Where are you from?" He told him he was from Omaha, Nebraska. St. Peter had to look up that place. He finally found it on the map on the Missouri River. "On what grounds do you claim admission?" He told him he had been in business for 20 years in Omaha; always friends with everyone; generous to the poor. He told St. Peter he hadn't belonged to any church, made no profession of religion but he had always done right and thought he was entitled to admission. St. Peter looked up his record and found he had been telling the truth. "All right, sir, you are the kind of man we want, walk in and make yourself comfortable." He found a beautiful city, diamond door knobs, electric lights, beautiful groves and flowers. But one day he went to St. Peter and told him he was lonesome, he didn't meet any acquaintances or friends. Two weeks went by and he finally asked St. Peter if there was any communication with the other place. Peter told him there was, that he could go one day and back again the next with a return trip ticket. He told him he had been there two weeks and would like to go down and look around. He gave him his ticket and he walked away, but came back and told St. Peter not to bother about a return trip ticket, one way would do. That is the way I feel when I come to these conventions.

I want you all to join in the chorus of the Battle Hymn of the Republic.

Encored.



By the President:—Mr. Gilkerson is a dairyman from Marengo. He gave the association a very interesting meeting up there, and he feels very well satisfied with results.

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RESPONSE.

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By

Charles Gilkerson, Marengo, Ill.

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Mr. President, Mr. Mayor, Members of the Illinois State Dairy-men's Association, Ladies and Gentlemen:—

It is with pleasure I respond to the very cordial address of welcome from the Mayor.

We already feel the cordiality of the welcome in the air, and from the appearance of your city, and the surrounding country, we feel that the Association was well warranted in selecting Clinton as a place of meeting this year.

The Association does not come to your city simply to have a place to hold a meeting, but also to carry the beneficent influence of their meeting and presence to various parts of the state.

For the first time in several years we meet in the central

part of the state, which ought of itself to insure a large attendance but the strong program provided ought surely to make this the largest and best meeting the Association has ever held.

The awakened and renewed interest in dairying and dairy methods means much to this great state, with over 1,000,000 cows and the wealth resulting therefrom.

Although you have worked hard, and will work hard until this convention is closed, I predict for you much satisfaction and profit as a result of this meeting.

My home is at Marengo, McHenry County, 16 miles from the Wisconsin state line, and situated in the heart of the great dairy district from which Chicago draws her milk supply.

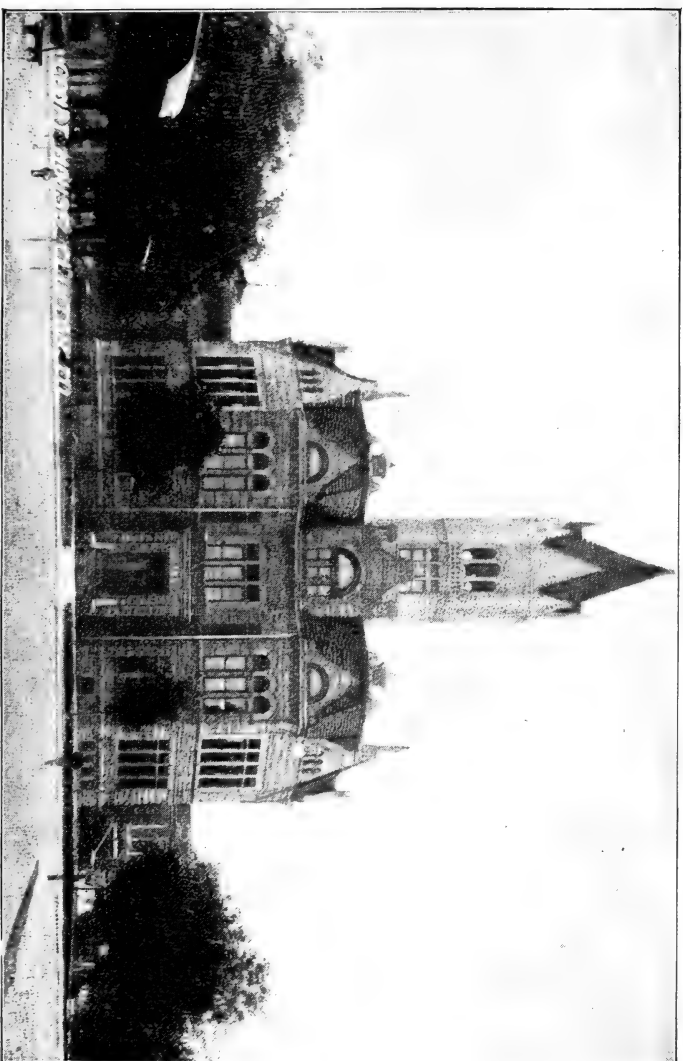
It was 35 years ago that this Association was organized in Woodstock, our county seat. The first president was from Elgin, in the county which joins us on the south.

Our county is noted for having a large number of students at the Agricultural College at Urbana, showing the interest our young men take in these matters. But it is the result of years of agitation and education along these lines. And yet, at this late day, we are just beginning to learn the rudiments of dairying, and you see we have been at it over 35 years.

Last year we entertained the association at Marengo, and I personally know the work and energy it takes to entertain a convention of this kind, and for that reason more heartily thank you for the cordial welcome we received. But we hope that you will not be so exceedingly busy and "cumbered about with much serving" that you cannot enjoy the sessions of this convention.

We hope to bring you something in social intercourse or program that will in part repay you for the effort you so cheerfully are putting forth.

The dairy conditions are somewhat different in your locality than in ours. Nearly the whole of the milk produced in our section goes to the Chicago market. As a consequence, we are short in the production of butter and cheese, so that some other locality must furnish us with a large percentage of that product. So it



DeWitt County Court House, Where Convention Sessions Were Held.

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seems very fitting that the State Buttermakers Association should meet with us in convention.

We come here to exchange ideas, and to listen to the best speakers obtainable from all parts of the United States. And in bringing to your door the experience and intelligence of these men we feel confident that your community will feel the influence of this meeting in all the years to come.

We ask you to take part freely in the discussions of this convention, and also to become members of the Association, and push forward the organized efforts of the dairymen of Illinois by your membership.

The association stands for the best interests of dairying by education and legislation. Dairymen are born, not made. By that I do not mean that a man who was not raised on a dairy farm cannot learn to be a dairyman, not at all. But unless you like a cow, and are willing to hustle, you had better stay what you are and be good at that.

This reminds me of what Gov. Hoard said at the National Dairy show: "If the cow could talk, she would be heard all over this country bawling for a better breed of dairymen."

Our common schools do very little to educate our young people along dairy lines. The only place we can get such instruction is at our Agricultural College.

It has been said that we should keep only one-half the cows we do, but better ones. I believe we ought to keep the same number of cows, but those which are at least twice as good. We must make this our ideal, and stick to it until we "get there." This reminds me of the advice of Josh Billings to a boy. He says: "My boy consider the postage stamp, and learn that its usefulness consists in sticking to its object until it has reached its destination." Successful dairying is not obtained in a day but comes through intelligently sticking to your object till you "get there," or at least measuring up somewhat with your ideals.

In the matter of legislation, there should be a bill passed at this session of the Legislature to restrict the importation of tuberculous cows into the state, and also to provide for the re-

muneration of the dairyman for loss sustained in slaughtering cows responding to the tuberculin test. We should also encourage liberal appropriations for the department of dairy husbandry at the University.

In closing, we wish again to most heartily thank you for the welcome you extend to us, and in giving us the liberty of the city. I assure you that there is no need to increase the police force. An official statement has been made by the Warden of the penitentiary at Joliet that only 49-100 of 1 per cent of the inmates of that institution were, at the time of their arrest and conviction, engaged in agricultural pursuits. So you see we are quiet, peaceable citizens, drink milk, go to bed early, and get up early. There is no doubt in my mind he was a dairyman in embryo who said: "Early to bed, early to rise, makes a man healthy, wealthy and wise."

I thank you.

By the President:—The next thing on the program is the same old thing, the annual address of the President. He always gets stuck for considerable work, and then has to write a paper about it. I am glad I shall not have as much trouble getting this address before you as Gov. Deneen did before the legislature.

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#### ANNUAL ADDRESS.

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By

President L. N. Wiggins, Springfield, Ill.

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Members of the Illinois State Dairymen's Association and Friends:—

We meet this year in the "Heart of the Corn Belt"; within a stone's throw of a new creamery enterprise. The Dairy Cow, the Foster mother of the Nation, is making her commercial in-

fluence felt with great force. The value of her yearly products are colossal.

According to the recent figures of a painstaking Statistician, every man, woman and child in the country consumes annually over 100 gallons of milk and its products. The actual amount of whole milk consumed each day averages about .65 of a pint for every individual.

The value of this product for a year, at retail, is the startling sum of \$2,500,000,000. This is almost one-fifteenth (1-15) of the entire wealth of the nation,—five (5) times the wholesale value of last year's wheat crop; nearly twice the value of the corn crop and over one-third (1-3) of the entire value of farm products for the year 1907. The wholesale values of Dairy Products last year, was estimated at \$800,000,000.00 which would allow a price less than ten (10) cents per gallon for milk at the Dairy. An average retail price of seven (7) cents a quart was assumed, which is probably a little above the average price. So you see the clean milk problem is a vital one, affecting the production and consumption of over 9,000,000,000 gallons per year and a great percentage of this milk is paid for with cash. Illinois claims one-twentieth of the dairy cows of the nation.

Your Officers have had a busy year and I feel that much permanent good has been accomplished. Since our meeting last year at Marengo, we have had meetings at Washington, Havana, Highland, Effingham, and at the State Fair.

We have distributed an immense amount of literature—sending it directly to the Dairy men and farmers.

We have endeavored to stimulate interest among the non-Dairy men as well as the converts.

It is highly important that all breeders of dairy cattle learn to appreciate the advantage of well bred dairy sires, those which are raised from producing parents—parents whose records show large yearly production. A well bred sire does not cost but a mere trifle when figured in dollars and cents with the results gained in breeding up a herd from native cows.

We have endeavored to bring these facts directly to the farmers.

The question of Bovine tuberculosis is a very live one. Great interest is displayed and many cities have adopted strict laws to prevent the entrance of infected milk within its limits. No one can seriously question for a minute the immense importance of this subject. Our neighboring states, for several years have been sending the cows which have reacted from the Tuberculin test to our State. We have been buying them at big prices. It is time that we considered the ways and means of preventing them from making this state a dumping ground.

Our breeding and milking herds should be jealously guarded from the spread of this disease, from the financial standpoint as well as for the health of our families.

Upon the recommendation of this Association, the State Board of Agriculture recently combined under one head the Dairy Products Department and Dairy Cattle Department. Mr. A. O. Auten was appointed Superintendent. This appointment will assure us of a Superintendent who is actively engaged in the Dairy work. I earnestly request that every Dairyman will give Mr. Auten his active support. It is up to this Association to see that the classes in butter, milk, cheese, etc., on the premium list of our State Fair are well filled, because we have promised our help and co-operation. Already steps have been taken to give new life and standing to the Dairy Products Department and within a few years I hope to see at our State Fair an enormous display of products.

I wish to again impress upon you at this time the importance of systematizing your Dairy operations. Keep the records of the production of your cows. Do not overlook the commercial value of the *milk scale and the butter fat test*, as well as the feed scale.

Study your farm and dairy Journals. Dairy farming is a special business full of detail and it is necessary to use all the thought and careful study at one's command. I know of numbers of men who give up the Dairy business because their "wife's health is bad." If those farmers had used a little more "gray



matter" I believe their wife's health would not have been seriously affected. They would have seen better ways to produce and market their dairy products.

And in this connection I wish to remind you of the short course on Dairying given at one Experiment Station. The young and old cannot afford to miss this educational course. If you cannot go, send one of the boys.

In behalf of this Association I wish at this time to thank Mr. Sudendorf for his earnest and painstaking efforts to make this meeting a success, and I sincerely hope his new creamery, located in your city, will be a success. The farmers and Dairymen of this locality are extremely fortunate in having such a market for their cream and milk, and I hope you will all support him.

I wish to thank our Secretary and Board of Directors for their hearty support during the past year. Many hard problems have been undertaken and through their earnest co-operation we have been successful.

At the State Fair, they have arranged for permanent headquarters where the dairymen can meet with one another and become better acquainted with the improved methods of conducting the dairy business. There is no formal program, but a Getting-together place. Next year there will be a tent, or maybe a building erected there for us. Come and bring your friends. We served a light lunch to the dairymen last year, and they seemed to enjoy it.

Mr. Caven has a list of the committees he will read. On Membership Committee:

Mr. Fred Zeigler, Clinton, Ill.

Mr. S. J. VanKuren, Chicago, Ill.

Mr. M. Pervis, Chicago, Ill.

Mr. Chas. Gilkerson, Marengo, Ill.

Mr. W. Sudendorf, Clinton, Ill.

Mr. Caven:—We feel there might be some present who would like to become members of the association.

By the President:—Their labors do not cease this morning, but keep it up this afternoon, tomorrow and the next day. You know “in union there is strength,” and the more members we have connected with us, the better results for all of us.

By Mr. Caven:—I would add that the report of this meeting, when published is first mailed to all members.

Resolution Committee:

Mr. Jos. Newman, Elgin, Ill.

Mr. Thomas Foster, Springfield, Ill.

Mr. Carl E. Lee, Urbana, Ill.

By the President:—This session this morning is intended to be a preliminary session, and this afternoon the real work of the convention begins. Among the speakers for this afternoon is Prof. Erf of Ohio, who formerly was at our University at Urbana; Prof. Fraser of the State University, and Prof. Farrington of Wisconsin. Prof. Farrington recently spent a year in Europe, and all of his time was spent in the dairy countries of Europe and he examined into the dairy conditions there. He took a great many pictures of dairying in those countries, and his lecture will be illustrated by views, and in order to show those views to advantage Prof. Farrington will come last on the program, and we will adjourn to the Gem Theatre. The proprietor has kindly offered it to us for this lecture and the views will be shown through their instrument, which will show off the views to greater advantage, and it will be interesting for all of you. Tonight the young men will probable be interested in knowing that the society of Eagles have invited the members to their dance. They assure us that they will have a committee there to introduce us, and see that we have a good time. Some of the older men will like that too, they are all welcome.

We will now adjourn until 1:30 sharp. I would like to ask the gentlemen of the city who happen to be present to request the ladies, or inform the ladies we will be glad to have them here to listen to these meetings.

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**Tuesday Afternoon, January 19, 1909.**  
**1-30 P. M.**

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President in the Chair:—I was waiting for some of the men who are still in machinery hall.

We are very fortunate to have with us Prof. Erf of the University of Ohio. He has charge of the extension work over there, the entire dairy department of the University. He is considered one of the most practical men in the country in dairy work. He can go to any branch of the dairy business, and from the scientific end give reliable information. I consider it a great pleasure to introduce Professor Erf.

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**ADDRESS.**

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**By**

**Prof. Oscar Erf, Ohio University.**

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Mr. President:—Ladies and Gentlemen and Members of the Association. Your honorable president has made it rather strong. I cannot answer all the questions. If I could, I believe I would not be here today. But it is my aim, and it has been, to be as practicable as possible under all circumstances. I, myself, am operating a dairy plant. We have at present about 160 cows and we operate and try to make money, which we are doing and have done. In connection with that, we are also operating a milk plant and butter plant. So you see I am trying to take hold and keep abreast with the whole proposition.

I realize the position you are in here around Clinton. About ten years ago I visited your country for the first time. It was very rich and fertile then, and I believe more so than now. I

have been traveling through your country year after year since then. I know you have the greatest corn spot on the face of the earth. But, friends, this is not going to be that way always. Bear that point in mind.

I attended a State Farmer's Institute at one time at Bloomington nine years ago. One of the farmers in that immediate vicinity—I want to say a soil fertility robber—said: "We needn't worry about our soil fertility, we got fourteen feet of muck under us, and that will last from now until doomsday." He said further: "When our soil becomes exhausted, all we need to do is to stir up a little of the bottom and bring it to the top, and raise another crop of corn." I have been wondering what kind of a subsoil he would find when he struck the last fourteen feet. I am reminded of a little incident that happened to Mr. Sudendorf. A man came in one day and said, "Well, this butter color is not worth a continental, used it all I could." Sudendorf says to him, "Don't you ever go into the woods, my friend, the squirrels would eat you." He looked at him and said, "Why?" "Because you are nutty." That's the same way with that fellow. He is wrong, entirely wrong.

I want to take this problem up from the standpoint of soil fertility. The chemist says that when you sell a ton of wheat, you are selling \$8.65 worth of fertility. If you are selling a ton of corn you are selling \$6.50 of fertility. In other words, you are cutting off so much of your farm and selling it. He also tells us, a ton of butter—I mean clean butter—you are selling 36 cents worth of fertility; a product that is valued at \$500 a ton today, and more than that. Compare that. You are selling 36 cents worth of fertility when you are selling \$500 worth of products, and in the case of corn or wheat, you are selling from six to eight dollars worth of fertility for anything ranging from \$20 to \$40 a ton. There is the basis of my argument today. I want you to bear that in mind.

How does it come, that by means of dairying, which is the highest form of farming today, we can conserve the fertility of the soil? We raise the corn, the clover hay. We feed it to the

cows. What does the cow do? She takes out 10 per cent of the fertilizing element of that feed, and gives you back 90 per cent in the shape of manure, which you can haul back on your farm. The first concentrated process. You feed the skim milk to the pigs and calves and the bulk of the fertilizing element in the skim milk all goes back on the farm. You virtually get all back on the farm, and if you buy some feed, why, you are buying fertility. You might say, "That's well enough for a chemist to say, can you prove your statement?" Again, "Can you give me an illustration of these facts. Yes sir, I can. It was my privilege a few years ago to visit some of the countries in Southern Europe. The most interesting facts I have to say to you is that great stretch of land around Rome, the basis of the Roman Empire, if you will read history. It was the richest spot on earth, yes, the richest spot on the face of the earth. They raised grains there in abundance, but what have we there today? A desert my friends. Not even grains will grow on that soil. Let me go to the north part of Italy, and what do we find there? You find farms there which today are yielding from 30 to 34 bushels of wheat, and have been under cultivation for hundreds of years. Why is this difference? Simply this: In the north of Italy the dairy cow has been kept on the farm, while the other place none have been kept. That is the secret.

Switzerland, and you find great big farms, no wheat, no corn, nor any other grain. Grass is the only thing that grows there and the only profitable crop they can raise. They feed it to the dairy cows. If you ask those gentlemen what is the land worth—because frequently we are reminded in this country that you can only raise pasture on cheap land—they will tell you that land is worth from \$1500 to \$1600 an acre; some of the land in the mountains from \$300 to \$700 an acre. What makes this increase in the price of land? Simply this: The increase of production and the profitableness of the dairy cow. It is the only thing that makes interest upon that land.

You go up the Rhine to the farms there, or to Germany and Holland, the paradise of the cow, and their land ranges in

price from \$1500 to \$2000 an acre. We ask, "Do you grow any corn?" No. "Grow any wheat?" No. "We ship all we buy from Illinois and feed it to the dairy cows." "Can you make interest upon this soil?" Yes. "Our renters pay from \$40 to \$60 an acre for rent per year." Just think of it. Take an illustration: Suppose you had a factory here, in which you had invested \$10,000. At the end of the year you would expect a nominal interest of 6 per cent. But, after doing a year's business, you find that you have actually made 12 per cent. What do you do? Would you sell a share of that stock, if it was worth \$100 for \$100? No. You would want \$200. Your factory, instead of being worth ten thousand dollars, would be worth twenty thousand dollars. And that is the way the dairy cow has raised the price of land in the European countries.

#### Conditions In the East.

Now let's come across the ocean, and what do we find? I have traveled extensively in the east, I know the country there. That soil upon which the Pilgrims set their foot is now a hazel brush and it was once rich and fertile. A few years ago Rhode Island ran a Homeseekers excursion. When you want to go to the wilderness of the United States you don't go west now, you go east. I come this way a little further to the land in New York, and I find abandoned farm after abandoned farm. They had fine houses upon them at one time, beautiful mansions, beautiful buildings, but gone now into decay. Now and then I strike parts of that country that is profitable and prosperous. I asked the man how much his land is worth there, and he tells me it runs from \$250.00 an acre to about \$500.00. I can show you land in the Mohawk Valley worth about \$450.00 an acre. I have a proposition on my desk for 185 acres of land, no more than five miles from that place, which once was better than the land which is now worth \$450.00 an acre. Upon this 185 acres there are five acres of orchard, a barn and a house, and I can buy

it for \$1000.00. Gentlemen, I wouldn't have it, not at that price. Why is land over here worth \$5.00 an acre and land over there \$450.00 an acre? Tell me why? Simply one reason, the dairy cow has been kept on the \$450 an acre farm for nearly 100 years, and has increased the soil fertility, and upon the other farm, there was a soil robber, a grain raiser. This may strike deep into the hearts of some of you gentlemen here. These are facts, you cannot get over. I don't mean it in the sense of contempt, not at all, but when you are raising corn and grain continuously, you are destroying your soil and reducing the prosperity of your country. So often you expect your younger generation to do the same and make the same profits you have made. I can give you example after example. The northeast part of Ohio, where I come from, fourteen years ago was virtually depleted of its soil fertility. You could go buy land all over that country for \$12.00 to \$20.00 an acre. But you go back there today, and you can't buy it for that price, but on every farm that you will visit, you will find there are dairy cows, raising the soil fertility and making conditions more prosperous.

#### **Cow Brings Prosperity.**

It was my good fortune to visit Portland, N. Y., last summer, and that country 20 years ago I know could hardly raise white beans as far as fertility was concerned, but it has been making wonderful progress. Out of the City of Portland, 19 cars of milk is shipped every day, 250 cans in a car. That shows you the reason why that country is getting prosperous. They keep dairy cows now. Friends, history repeats itself, and you are in no better condition than the people in the east in the rich valleys. In particular I speak of the great Huron Valley, the most fertile soil, they told us years ago, upon the face of the earth. They didn't know about this great country around Clinton. It has gradually gone down until it reached the stage where they had to keep dairy cows in order to restore the soil fertility.



It is up to you gentlemen to take hold of this thing just as soon as you can. You must redeem your soil by keeping dairy cows upon it. You may listen to a great many farmers who say: "Well I can buy commercial fertilizer and keep up my soil fertility." You may hear a good many people say: "I can raise a crop of clover and plow it under and get soil fertility that way." My friends that has all been tried. There is nothing like the good old fashioned cow's manure to bring up soil fertility. That is the thing that will do it, and the sooner you get at it the better you are off. The people in Europe don't dairy because they want to, but because they must. It is up to you gentlemen to get at it, just as soon as you can. So often I hear the remark: "There isn't anything in the dairy business." They say: "I have tried it and there isn't anything in it." I am often reminded of the story of the little boys who were playing in the back yard. They began to brag. One said: "My father has a cupola," and the other said: "My father has a surrey," and the third boy couldn't think what his father had. The oldest boy said: "He's got the big head." He went home sobbing, and as soon as he came in his mother said to him: "Johnny what's the matter, what are you crying about?" "Charlie says pa's got the big head." "Never mind," said his mother, "there's nothing in it." You can take this thing in two ways, and so with the dairy business. There isn't anything in it, if you don't run it right. If you run it right it is a profitable, and a most profitable line of farming.

What's the reason, we ask, a certain dairyman can't succeed? Why can't he make money? Simply because he hasn't the implements—I mean the right kind of implements to make money. He hasn't the right cows. We carried at the Kansas Experiment Station for a number of years, a cow which made us a pound of butter for  $8\frac{1}{2}$  cents. Another cow, fed practically the same feed and required same care, charged us 24 cents for every pound of butter fat she produced. She was like the Jew who swallowed \$5.00; the doctor got \$3.75 out of it. It is the way with our cows, we do not get out what we put in.

**Cost to Keep a Cow.**

What does it cost to keep a cow? I have it on a chart here. I have the feed cost for a year, and bear in mind, this is not from one individual herd, but estimated the average of 540 cows. The average cost was \$59.42 for one year. The labor was \$24.00 per cow for a year. Some of you gentlemen might say: "It don't cost me that much. My wife milks the cows." If I should have my wife milk the cows, I would charge \$48.00. The cow is worth \$50.00. I don't know what your cows are worth here. In eastern Indiana, and Ohio and Pennsylvania the cows sell at the present time for about \$60.00. Some put it at \$50.00 and 6 per cent interest makes \$3.00. She deteriorates with age. If you buy a cow and milk her until she is 13 or 12 years of age, she wouldn't be worth \$50.00. That was figured on each cow \$2.50 a year. Death of cows by disease or accident, \$1.50 a year. That is over a period of years and apportioned on each cow. I don't know if you gentlemen are required to comply with the sanitary regulations but this is a very conservative estimate, \$3.00 for a cow for cow barns. The bull service is \$2.00. The general maintenance expense, \$2.50, estimating accident, insurance, repairs, painting your barns, your dairy houses, everything of that kind is included in this particular item, \$2.50. Hauling of cream, \$2.16; straw for bedding cows, \$8.00 a ton in Columbus. I don't know what you would estimate your straw here, but I figured to estimate it about a dollar a ton and that is \$2.00, making a total cost of \$102.33, as the cost of the cow for one year. You might say that is a big price; but what are the returns from a dairy cow? Prof. Thom of the Experiment Station of Worcester, made a series of experiments and estimated that with 35 cents as the price of phosphate slack, manure was worth \$4.50 a ton. Around Columbus it goes for \$14.00 a ton. Let us not estimate at these high figures. We will put it down to where the farmer has it, \$2.75 a ton. We have here for the first item, \$27.50; 20000 pounds manure a year, consequently about \$25.00. Skim milk, 30 cents a 100.

This is a good cow and 6000 pounds skim milk makes \$18.00. I don't know what you consider skim milk worth here, but according to Mr. Henry's experiment, it is worth 25 cents a 100 if corn is worth 35 cents a bushel. Corn being worth about 60 to 70 cents a bushel, consequently doubles the value of the skim milk. You see I have estimated the skim milk very conservatively. We can get around the cities 40 to 50 cents a 100 for skim milk. We are selling our skim milk at 70 cents a 100. It must be sweet. So I say this is a very conservative estimate at 30 cents a 100, making \$18.00—the calf \$2.50. You may object to that and say a calf is not worth anything. A good dairy calf is worth something always; bull calf worth nothing. Consequently the increase from a cow, other than butter fat, is \$48.00, and that reduces the cost of \$102.00 quite a bit, and compares favorable with the cost of labor, interest and other items.

I tested a herd not long ago, and this was the result: 20 cows produced on an average 3000 lbs. of milk. Cost of keeping of cow was \$102.00, for 20 cows \$2040.00. The average production of milk for one cow was 3000 at 4 per cent, 7000 gallons. 7000 gallons cost \$2040.00. The cost of a gallon of milk was 29 cents. We are actually getting 12 cents a gallon estimating on the butterfat basis. 30 cents a 100 for skim milk and sell at 12 cents for 4 per cent milk. It cost 29 cents to produce that milk and we only got 12 for it, consequently there was a loss of 17 cents on every gallon of milk those cows produced. At the end of the year, this herd lost \$1190.00. But the value of the manure, \$27.50, and the calves we have reduced the loss to \$590.00. Some of you probably have heard the story of the boy at school studying physiology. The teacher was instructing them on the functions of the body, the eye was to see, the ear to hear, the fingers were to feel, the nose to smell and the feet to run. And then a little boy cried and said: "I must be made wrong, my feet smell and my nose runs." That is the case with a good many dairy cows. We kept a record of this herd, and there were three cows, and this was the return from those three cows: 320 lbs. of butterfat, \$68.50; skim milk, \$63.00; value

of manure, \$82.50; three calves worth \$7.00, making a total of \$421.00, as the income from these three cows. At \$102.00 for the keeping of a cow, three cows, \$306.00; the net profit of these 3 cows would be \$115.80, and here we had a loss of \$590.00 keeping 20 cows. Before those fellows got down to that, they were feeding those cows for the glory, and there is mighty little glory in the milk business. I don't mean to say now that you should keep three cows, you can increase this herd, but keep good ones.

Now, how can you determine it? Determine the value of the cow. This is very simple, by weighing the milk and testing it, and by weighing the feed, estimating it, finding out how much feed put into the cows and how much from our returns. You might say that requires too much labor and expense. We are milking 160 cows, and if I have to pay a man \$10.00 a day to keep records of those cows, I will do it. It is very important. This summer we adopted the method of weighing every day. We used to weigh once a month, but we now compel our men to weigh every milking. You probably think "What's that for?" Simply this: We know exactly what each milker is doing. I am not there in the cow stable very much. We are dependent more or less upon the men who do the work. And if a man milks a cow and that cow averages about 16 lbs. every milking and he hangs that milk on the scale and he finds he is only getting 10 lbs., instead of 16, we tell him to go back and try and get the other 6 lbs. He has to do that right. The milk is delivered to the creamery. When it does not foot up right, we are looking for the man that does wrong. We keep check on the whole system that way. We find that it pays. You will be surprised at the little difficulties and what a great difference it does make in the profits of a dairy cow. I particularly noticed the past year one little thing that interfered with the dairy cow, bee-stings. Cows often during the fall get stung by bees, and we keep tab by weighing and finding out what a little thing like that has on the herd. A good many of us don't pay any attention to it and let the thing go on. It is the finest thing to go

to your records and notice. Here is a cow that has given so much milk from day to day, and suddenly she drops off. What's the matter? Tuesday of last week she did so and so. In this way we have got the problem solved. If you do not keep a record, you don't know anything about it. We tried at the Experiment station the amount of time that it took to take care of the records of 15 cows for one year. It was something like 9 hours and 10 minutes. We cleaned out a herd that wasn't making us any profit, and at the end of the year we could account for a profit of \$140.00. That is what we actually made by keeping a record, or by spending 9 hours and some odd minutes the previous year. I ask you whether that doesn't pay? Is there any other business on your farm that pays you more than \$140.00 for 9 hours and 10 minutes work?

The cow-test associations are becoming yerv prominent. We have in the northwest state of Ohio, Holland Fresian Breeders' Association, that takes care of the test. One of the grandest organizations ever organized. What do we mean by cow testing associations? Simply this: Some of us get tired of testing, and finally we don't care what the cows do do. We have gotten negligent. But organize into an association, and contribute a certain amount to a treasurer, and he hires a man that goes around from place to place and tests your cows, or, in other words, as a bookkeeper. It will certainly pay you at the end of the year to attend to this. Northern Ohio cow test association pays \$1.50 for every cow to this man who keeps a complete record and shows you the profit or loss of each individual cow. The U. S. Department of Agriculture is sending a man around for the sole purpose of organizing these associations. They are a great benefit. This is one way of making your herds profitable if you have one. But often people do not have cows, and the question comes, what kind of a cow shall I buy? Gov. Hoard says the darkest place on earth is inside o fa cow. External appearances are not always good guides for judging cows. There is a rough similarity to all good dairy cows, but to go out and pick out a good cow out of a lot of dairy cows, is always an im-

possibility. What are those qualities which are indicative of a good dairy cow? First, the large udder. Here is where the milk is made. The milk is made from the blood. But we must remember that the udder should be large, but not fleshy. How determine that? By milking out the udder and notice whether still distended or loose and flabby. The next important item is the milk veins. This is called the milk vein, but it is really the blood vein. That takes the blood from the udder and draws it back into the heart and lungs. This must necessarily be large. If a cow must give a good quantity of milk, there must be good storage capacity. A large pipe system is necessary for a good cow, because when you milk, you draw largely upon the heart, and the larger the pipe system, the better your cow is. A good big heart is necessary to pump a circulation; a good big lung is necessary to purify a large amount of blood. If that is the case you want a cow that is wide in front. Not at all. We will compare this with a racehorse. A racehorse expends more energy in trotting a mile in two minutes. I will illustrate this point better. I will run and you walk as fast as you can. Not one of you could keep up the pace if you started with a full capacity at the end of a mile. But you can walk all day and not get tired. It shows that the energy required is in a confirmation where the chest and heart are similar to that of a racehorse, because it takes energy to make a milk in two minutes, and considerable energy. The lung activity and the lung wall must be thin, and the heart must be big. Consequently you get confirmation with a large digestive capacity.

I am showing you a cow that is a Holland Fresian. You may say I am partial. That is not the case at all. I am going to show you other cows where the same confirmation is preserved. I will say the average cow produces 135 lbs. per year of butter fat. This is a question of profit and if a man is in this business, he ought to make some profit. You cannot afford to have a cow making 3 cents tallow by putting meat on her, when you can get 30 cents for your butter.

I just want to call your attention to the soil fertility and feed. The president has given me a little more time, and I would like to talk a little more on the feeding problem. Composition is a very important thing in feeding, but not the all important thing. The man that feeds the cow has just as much to do, and I want to leave three things with you that will regulate the feeding problem. First, feed the cow what she likes. Feed her according to her production, and for digestibility. See that it is properly secreted and no indigestion. Mix good common sense with it all and you have the feeding problem solved. We must feed protein because it is absolutely necessary that we feed a certain amount of protein in order to get a certain amount of protein in milk. You can get the protein from any other source, except through the feed. But feed that cow just as she likes and what she wants. Don't feed her corn entirely, or straw or corn stover. That is no feed for a dairy cow. Feed her legitimately and she will respond, and then you will have, if you feed her right good fertilizer to put on your soil. You cannot feed a beef cow and make as good fertility as you can feed a good dairy cow with concentrates that contain a high per cent of protein. Bear these things in mind, and don't accuse your sons and daughters for not making as much money from the farms that you have left them as you have made, because you have robbed the fertility from the soil. Think of all this, for if you do not you will be something like the boy that had to drive the cows to pasture every morning, and one morning the cow broke into the steer part, and there was a calf, and this calf got mixed up with the steers, and in his attempt to drive the steers from the cows, one of the steers got out of the pasture and the little calf followed the steer down the road thinking it was its mother. The boy started out to head off the steer, but he didn't succeed, so he tried to get the calf and he didn't succeed. He stopped and he hollored, "You will find out what kind of a cow you are with when sucking time comes." That is the proposition you will be up against if you do not provide for it. I do not mean to say you should go into this business extensively. Try it and go into it gradually. I don't ask you to buy pure bred or expensive ani-

mals. That is not the proper way to start. You cannot start with pure bred cows if you haven't had any experience in the dairy business. Start in with your grade cows, but have a pure bred sire. All of you can afford that. Breed from this pure bred sire; weed out your poor cows and grade up your good ones, and you are sure to make a success in the dairy business.

I want to thank you for your kind attention.

By the President:—We are very much indebted to Prof. Erf for giving us this interesting lecture. We have a lot before us before we adjourn to the Gem Theatre to see the pictures. There will be no charge over there. That is part of the entertainment. I hope every one will remain and listen to Prof. Fraser, and then we will all go over to the theatre and listen to Prof. Farrington and look at his pictures.

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**POSSIBILITIES IN MILK PRODUCTION PER ACRE.**

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By

Prof. W. J. Fraser, University of Illinois.

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People have long been studying markets and competition from other countries. Farmers have been seeking cheaper lands in less congenial locations, climates and surroundings, and suffering the privations of pioneer life in a new country and depriving themselves and their families of the rights of a developed civilization. All of these have been much discussed in public speech and print, while the real economic agricultural problems and possibilities right at our feet have been overlooked. The problem for the people of Illinois is "How to develop their own agricultural possibilities."

Since agriculture is such a broad and comprehensive subject, and has so many different phases, there is a tendency to go off on a side line and lose sight of the fundamental principle on which all agriculture is based, namely, "How much of a given product can be permanently obtained from an acre of land, and at what profit?" From this fundamental, basic standpoint, the dairyman's problem is "How much butter fat can be obtained from an acre of land, and at what gain?"

We constantly receive letters of inquiry in regard to the relative value of different feeds for dairy cows, at certain prices, such as the comparative value of oil meal and cotton seed meal, oats and bran, etc. There is also much discussion and much money spent in determining, or attempting to determine, in an experimental way, the relative feeding value of these different feeds. This information is of value in a general way, but so much energy and thought have been devoted to it that it has come to be considered one of the uppermost questions in milk production, while the larger and more significant questions which dairymen need most to know have been concealed by this discussion and these really minor questions have almost entirely hidden the more vital ones. These are "The amount of digesti-

ble nutrients that can be produced per acre," and "The maximum profit derived from a given area of land in milk production."

The result of all this is that the possibilities of milk production are little realized by most investigators, as well as the best practical men engaged in this occupation at the present time. These are strong statements, but they are nevertheless true. The chief obstacle to progressive dairying is the attempt to carry it on without the application of business principles. The milk producer must stop guessing, and know for sure what the results will be of the different operations conducted in different ways, and adopt the one that will return the most profit. The dairyman must be a money maker, and, like any other business man, must know how to invest this money to get the greatest possible returns for the capital and labor involved. He must aim to stop the leaks, but at the same time not be afraid to invest a dollar where it will bring large returns.

A great mass of the cows milked each day are kept on farms where dairying is a side issue, or, at best, where the men are simply cow keepers, and not dairymen. Even on what would be considered good dairy farms there is frequently aimless breeding, thoughtless and shiftless feeding, caring for and housing of the cows, when considered from the standpoint of the great possibilities of dairying. All of this must, and does, result in utter lack of sufficient returns. These statements are not hastily made, nor without foundation. The investigations of the dairy conditions of the state, made by this department in the past twelve years, show plainly that the dairy farmers are not receiving the profits due them for the investments of money, time and labor that are put upon their farms. Dairymen have a vague and confused idea as to what, after all, determines their profits in dairy farming. They are very apt to look at the total receipts and think they are doing good business, when the profits may be small indeed, if any. It is because of this fact that large sums of money are invested in numerous acres of land, extensive and expensive buildings, costly horses, tools and machinery, high priced feed and labor, and all of this outlay turned to raising

crops that do not yield anything like the amount of digestible nutrients per acre that should and can be obtained, and to feeding and caring for a herd of cows utterly unable to return a profit because of their inefficiency and poor care. The same expenditure of money, skill and labor bestowed in an intelligent manner upon good land and an efficient dairy herd would return a most handsome profit. There is abundant proof of this on the dairy farms of Illinois. Many examples, personally known to the writer, might be cited where men have started with nothing, and in a comparatively few years become well-to-do through the business of milk production, while others in the same neighborhood, having farms paid for, to begin with, have lost them through slovenly methods and inefficient cows. We hear much about the drudgery of the dairy business, and this is true under existing conditions on many of our dairy farms today.

A dairy farm, like any other business, must be run at full capacity and upon firm business principles if it is to be highly remunerative. It must be made to yield the maximum that can be economically produced.

If every acre of the farm is made to produce a good crop every year, and this crop well harvested and saved in good condition and fed to a dairy herd every individual of which is a good, economical producer, the results are astonishingly great. Good tillage, good seed, good crops, well harvested and saved and intelligently fed to good, efficient dairy cows, will multiply the present amount of milk produced per acre on our dairy farms from two to ten times.

There is still abundant opportunity in milk production for the young man of energy, intelligence and patience. The conditions are not the same as they were half a century ago. Land cannot be obtained so cheaply and easily, but with the increased population and modern civilization, there are more conveniences and fewer hardships to undergo, and with the modern knowledge of agriculture so easily obtained, the opportunities for financial gain in milk production are certainly greater than ever before, if advantage be taken of all the resources at command.

These profits referred to cannot be obtained in the old way of farming, and the importance of studying the modern methods cannot be overestimated. Competition is becoming keener every day. Fifty years ago there were very few pure-bred dairy cows in the country, agricultural colleges had not been started, and it is only twenty years since an agricultural experiment station was started in each state.

To demonstrate the possibilities in milk production per acre of land, a twenty acre dairy farm was started at the University of Illinois for this purpose. A small barn was erected, and efficient cows were purchased for this work. There was produced during the first year on this place 5952 lbs. of milk and 192 lbs. of butter fat per acre, all of the feed being raised on this land. The amount of money received for this, if sold on the different markets, is shown below:

Condensing factories at \$1.39 per cwt. milk....	.....	\$82.73	per acre
Shipped to Chicago, at \$1.57 1-3 per cwt. milk....	.....	93.64	" "
Shipped to Chicago to special distributor, at \$1.64 per cwt. milk .....	.....	97.61	" "
Sold to creamery, butter fat at 27c per lb. ....	\$51.84		
Skim milk returned, 4960 lbs. at 15c per cwt. ...	7.44	59.28	" "
Made into butter on farm, where man received an average price of 32½c per lb. for butter, or 38c for fat: 192 lbs. at 38c .....	72.96		
Skim milk returned, 4960 lbs. at 15c per cwt. ...	7.44	80.40	" "

This was done by raising corn and alfalfa and feeding it to efficient cows in an intelligent manner. It cannot be done on the ration commonly fed in the dairy region, consisting largely of timothy hay and dry corn stover for roughage, and with the inefficient cows so commonly kept. This is from three to four times as much as the best dairy farmers are producing, and eight to ten times what the average or poor farmers are producing in milk and butter fat per acre. This demonstration ought to be of untold value to the dairymen of the state, in giving them a glimpse into the possibilities of dairy farming, rightly conducted.

Wilber J. Fraser,

Chief in Dairy Husbandry, University of Illinois.

DISCUSSION.

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Prof. Farrington:—Isn't that pretty low price for skim milk?

Prof. Fraser:—We are trying to be fair. I think on the average that is about right. In some particular cases, if a man has calves to feed it would be worth a good deal more than that. Take it on the average, that is certainly safe.

Q.—How many cows?

A.—We hear a good deal about keeping a cow to the acre. We tried to see how much milk we could produce to the acre. An average of 12 cows for the year.

Q.—I am not clear on that feed proposition. Did you plant—

A.—I will come to that later. We did not pasture the cows at all. Simply corn and alfalfa.

Q.—You didn't supplement that feed by commercial feed?

A.—No feed bought.

Q.—Was that on heavy soil?

A.—Not the best soil in central Illinois.

Q.—Pretty fair soil?

A.—Yes sir.

Q.—At the State University?

A.—Yes sir, where the round barn is, somewhat low. We have 120 acres in the dairy department farm. We took the poorest 20 acres we had; one portion was a little higher.

Q.—If the soil was poor it would take more acres?

A.—Yes sir.

Q.—Only got ten ton to the acre?

A.—Yes sir, the next chart will show that. Like the soil in southern Illinois, and even there we want to get the largest returns for the acre we can. The man in southern Illinois with 40 acres of land in dairy farming is making more than any of his neighbors with 150 acres, just because he works his land well, getting in his crops at the proper time.

Q.—Is that the average price Borden pay?

A.—Yes sir, last year.

Q.—32½ cents.

A.—32½ cents to this particular man who retailed his butter in Freeport. 27½ cents average price for butterfat. This man has been in the business for five years, and he sold his butter the first few years for 25 cents. I told him he ought to raise his price. He said sometimes he couldn't make good butter. He first wanted to make good butter and then he would raise his price. We showed him how to control his starter and had good butter nearly every time.

Q.—How many dairies in Illinois are there where they make butter on the farm and get 32½ cents for butter

A.—Very few of them. Mr. Foss had smallpox in the fall and was quarantined. He could not, of course, supply his customers, but in the long run this did him good.

Q.—A farmer with 160 acres has got to get 39.15.

A.—Yes, sir.

Q.—Were they the same cows?

A.—The same cows. Some of them didn't freshen for  $2\frac{1}{2}$  months, some fresh about the time we got them out. It is a question whether we can do it again or not. That's what they did the first year.

Q.—Keeping 20 cows on 20 acres?

A.—No, 13 cows at the present time.

Q.—Did those 12 cows eat all that was produced on the 20 acres. You couldn't keep any more?

A.—We have 13 at the present time. According to figures, we are going to be a little short on feed before the end of the year.

Q.—Find any difficulty in getting 12 cows of that character?

A.—Yes, sir, we did. Some of the cow buyers tried to buy the best cows they could find, and had to pay a good price for them, and some of them none too good then. That is one of the worst difficulties in the whole proposition.

Q.—You didn't put any of the older cows from the farm?

A.—No, sir, we bought all we had.

Q.—How many cows run with the other strain of cattle?

A.—Right along with them. Some of them not worth milking and others a big profit. It is in the individuality of the cow.

Q.—Wasn't a numebr of those cows 10,000 pounds milk a year?

A.—Yes, sir, some of them. I couldn't say exactly which they are.

Q.—When you got a pretty good cow on the dairy farm, are you changing them from the poorest of these?

A.—No, sir, what do you mean.

Q.—Why, I mean when you got a cow not coming up to the standard and have a better one on the dairy farm, do you trade them around?

A.—No, sir, that would not be fair. The thing to do is to raise the heifers from those, and keep all going right along. I don't say we can keep up this 6.000 pounds of milk to the acre right along.

Q.—Will you express briefly why we want this protein?

A.—There are three classes of digestible nutrients, protein, carbohydrates and fat. The protein is the white of an egg, the lean of meat and that class of substance. Carbohydrates are the starchy substances and fat, you know the vegetable race and butter fat. The carbohydrates and fat cannot take the place of protein. We must have protein in the milk. No matter how much carbohydrates and fat you have and no protein, you cannot produce milk. You should raise alfalfa. A great many farmers of northern Illinois are raising it for the protein. Next is the red clover for those who don't want to raise alfalfa.

Q.—Alfalfa is a heavier crop to handle than red clover?

A.—Farmers want to get aware of that fact.

Q.—How about manure, can't you hold up fertility there?

A.—Yes, sir, you can hold up fertility, but you get insects.

Q.—It would pay to buy corn if you can raise alfalfa?

A.—Possibly. But to illustrate. The farmers in Illinois can raise their own grain.



Q.—Did you feed all your grain to your cows, or did you give your horses any?

A.—We didn't keep the horses on these 30 acres. The most part is the expense. 12½ cents an hour for labor and 6¼ cents for a horse, \$25 a year practically, I mean to the acre. Paid \$5 for straw.

Q.—How much help?

A.—One man. We didn't keep the horses, but the man that did the team work on the farm did it on this.

Q.—The same as a farmer hiring his work done on a farm?

A.—Yes, sir, providing he hired at the proper time.

Q.—Wouldn't take any more work on the land than the average dairyman on a farm?

A.—No, sir.

Q.—You got the labor pretty high?

A.—Yes, sir, but it takes a good deal of labor to take care of the cows, haul the manure—\$30 an acre clear profit.

Q.—Don't you think a man could do better on that size farm if he treated his cows well?

A.—We had to pay so much to get good fresh cows.

Q.—Wouldn't her flesh amount up pretty nearly to an offset?

A.—I don't think so.

Q.—Raise your calves on that land?

A.—No, sir, we do not. At the present time we want to see just what the production of milk was per acre. To get too many things in there it would make it too complicated. We wanted to keep the figures right. After two or three years the thing may be we ought to raise our best heifers to supply the herd.

Q.—Keep the calf as long as you have skim milk

A.—We take it over to the University creamery. At first we wanted to see what the production of milk per acre would be.

Q.—How did you feed those cows?

A.—We raised 8 acres of corn for the silo, 8 acres of alfalfa, 4 acres of corn for feed to grind.

Q.—Assume now that our folks here would take to dairying. By and by they were unable to put in the lands the number of tons you suggest, what would be the effect on the rock phosphate syndicate?

A.—Too much of a proposition for me. I don't understand the question.

Q.—I don't know as I can put it any plainer than that.

A member:—You wouldn't need to buy any phosphate.

Prof. Fraser:—We haven't put anything on this land at the present time, any phosphate or anything else. I don't know whether necessary or not. We tried to see what we could do with the barnyard manure.

Q.—You don't need any phosphate if you make the manure on the farm.

A.—That is right. Now about the feed. We fed them last year on corn silage, corn meal and alfalfa hay. This year,

whether doing the proper thing or not is a matter of doubt. It is one of the big questions. The proportion of the grain to roughage. We have silage heavier this year and feeding silage and alfalfa hay. The cow giving 40 pounds a day for the last two weeks, and she has been averaging 40 pounds, 38 pounds silage and 18 pounds alfalfa hay and 40 pounds of milk a day.

Q.—What milk test?

A.—Grade Holstein cow. Not a very low test, 3.5 probably for the year.

Q.—Doing as well in percent of fat as in the barn with a balanced ration?

A.—She has a balanced ration. A little too much protein, one difficulty feeding alfalfa; you can't raise anything that will do nearly so well. Having so much alfalfa to feed, so much protein.

Q.—If a farmer had land enough to raise this corn, would'nt it be more profitable to put in a little more corn and a little less alfalfa?

A.—I question if it would. If you have excellent cows and have them do good dairy work, feed them on a medium ration, and not feed too hard when they are fresh. All this needs to be provided for of course.

Q.—You don't think it hurts a good dairy cow to push her?

A.—It all depends.

Q.—For all there is in it?

A.—Yes, I do. I don't think it is well in the end.

Q.—You think the dairy cow will give more milk not to crowd her so much when fresh.

A.—I don't know how much in the year, but more economically. There is no country in the world that has more natural advantages than we have for producing milk. We have greater possibilities here than any country I know of. And right here in central Illinois is one of the best places. It could be made a lot better if we had more money to spend, and we can get it by dairying.

Mr. Mason:—What do they yield per pound per cow per year?

A.—I couldn't answer that question, Mr. Mason. It is difficult to get the yields of milk; a good many of them don't keep track of them. The Ayrshire, Holland and Denmark cows you see over there are very good, but there is room for wonderful improvements over there yet.

Q.—Get more out of their cows than we do?

A.—They don't get so much out of them as you might think. The cows in Ayrshire are elegant cows to look at. When you come to study the records of feed, the Ayrshires are about the same as we test in the state of Illinois. What's the reason? They feed nothing but pasture in the summer.

Q.—Don't feed their cows there?

A.—No, run them on pasture. Ayrshire is a great grass country, the same as in Holland. In Denmark they feed more grain. They don't use grain like we do, and they make cheaper milk than we do.

Q.—Outside of the silage preparation of corn, what would you advise in the preparation of corn.

A.—I think the thing to do is to grind your corn. Simply feed corn meal. The thing to liven it up, use alfalfa and cut out the bran. It depends what the best grain ration for a cow is



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until you know the roughage. If feeding corn silage and alfalfa hay, the grain ration is very simple.

Q.—All the silage you want and alfalfa, how much grain 75 to 85?

A.—Good quality alfalfa, I would feed enough to get the protein, 75 to 80, you want to feed a variety. I would feed some mixed grain.

Q.—Not very much corn.

A.—Yes, I would some if heavy on alfalfa, so much protein there.

Q.—How's corn, oats and clover hay for a cow?

A.—Very good feed.

Q.—What will a silo cost to hold 10 acres of silage, approximately?

A.—A silo for 10 acres of silage will be 150 tons probably. It would depend on how it is built. For 150 tons 18 feet in diameter and 36 feet deep. Built with boards going round and plastered with cement cost \$300. If a country where you can have gravel and crushed stone it will last a very long time and then you have a permanent silo with a perfectly rigid wall and one that will not let the air in.

Q.—How many cubic feet of silage is required to a ton?

A.—That will depend on the proportion of the solids. Silage in a 30-foot silo will average 42 pounds all the way up. The corn has to be cut at a certain time. It must ripen. Silage wants  $\frac{1}{2}$  cubic foot at the bottom more than at the top.

Mr. Newman:—They couldn't afford to cut corn stalks. If they wanted to keep 10 or 12 cows, wouldn't they have to grow clover for the soil?

A.—Yes sir, in my opinion in this country, if they are going to grow so much corn they must have some clover to keep the land up.

Q.—Why not eat the cornstalks?

A.—The thing to do is to put more cows on. They ought to raise some clover and what are they going to do with it.

Q.—What kind of cattle?

A.—I think that the Ayrshire and the Holsteins are best adapted as a breed as a whole, as anything we have. They are healthy cattle.

By the President:—We have enjoyed the professor very much and will hope to hear from him again. We better adjourn now to the Gem Theater to hear Prof. Farrington and see his pictures.

Gem Theater, By the President:—We are now ready to listen to Prof. E. H. Farrington of Wisconsin Dairy School, University of Wisconsin. He has just returned from an extended trip abroad and has some pictures here which he will show us. I take great pleasure in introducing Prof. Farrington.

At the close of these pictures, I understand that Prof. Fraser also has some pictures he took while he was abroad, which we will look at.

When a person is interested in milk and its products he will find something new to see wherever he goes. We do not all realize the importance to mankind of milk and its products. Statistics show that the annual value of these products exceeds that of wheat and nearly all grain crops except corn.

Anyone who makes an effort to improve the milk supply of a community at the present time will immediately receive the



sympathetic interest of all classes of people. So much has been done in recent years to improve the machinery used for handling bottled milk and to promote the inspection of dairies where milk is produced that a better, more healthful milk can now be obtained in many large cities than in some of the smaller country towns which may be nearer to the cows.

The ways of handling milk in American cities are comparatively uniform. There is not much difference in the shape of our cans or in the general appearance of the American milk wagons, but in Europe the milkman's outfit is quite different in the various countries that are not many miles apart. One of the sights on the city streets that a stranger notices in foreign lands is the way of delivering milk in that particular town.

If a stranger can speak the language of the country and he wants to see the central depot from which the various milk wagons on the streets are supplied, he can inquire of the man in charge of the delivery wagon from what source he obtains his milk. As a rule, manufacturing plants of all kinds in European countries are plainly labeled with "no admission" signs, and it is difficult sometimes for a stranger to obtain permission to visit even central milk depots from which the milk wagons supply their customers. A letter of introduction, or a title, or both are often useful things for a stranger to have, and if a large milk establishment in some city is the object of interest, it is advisable to make an application in writing or send one's letter of introduction the day before the intended visit. As a rule a stranger can receive all the attention he desires if he will conform to all the formalities and usual customs of the particular country in which he is visiting.

One of the peculiarities of the milk business that is very striking to a foreigner in going from one country to another is the size and shape of the milk cans. In Holland brass milk cans are very common. Many of them have the shape of our earthen jugs, although much more artistic in outline, and they hold all the way from ten to forty quarts of milk. In England the milk cans are called "churns." They have a different shape than the

cans of any other country, being of smaller diameter at the top than at the bottom and having straight tapering sides. In some other countries a square milk can is extensively used, while in Switzerland milk cans are made the shape of a knapsack and these are carried on a man's back. The German, Danish and French cans are also of different shapes and a person interested in making collections could easily find enjoyment in getting together the many different types of milk cans that are used in various countries.

### **Milk Supply of Rotterdam.**

Holland is known by everyone to be a very small country, but even in the limited area there is something of variety of customs as well as dialects. An observation in regard to the milk supply of Rotterdam would not, therefore, necessarily be typical of other cities and towns in Holland.

A great variety of milk wagons is noticed on the streets of Rotterdam, and I was informed that in this city of about 500,000 inhabitants a large proportion of the milk is handled by one or two firms. In visiting the headquarters of one of these milk supply firms, I found that nearly all the milk sold in the city was delivered by men pushing hand carts through the streets. The man is dressed in white and he either rings a bell which he carries in his hand, or one which is attached to a spring on top of his wagon so that the jolting of the wagon as he goes along the street keeps the bell ringing.

This particular firm had fifty-three of these hand milk wagons in use at the time of my visit. Each wagon delivered about 120 quarts of milk twice a day, making the morning trip from six to ten and the evening trip at the same time.

The milk is carried on these wagons in two square cans which fit into the box of the wagon. While going along the street the man rings his bell and customers go out to the street with some sort of a dish into which the milk is poured. There

is very little retailing of milk in bottles but this old custom of delivering on the street is still practised.

Milk is brought to sub-stations in the city belonging to this firm twice a day from about sixty farms. The price paid the farmer is about 2 cents per quart in the summer and 3 cents in the winter.

Men driving delivery wagons are paid from four to six dollars per week. Each one is checked out as he leaves the central station and the blank filled out for each trip shows the amount of business he has done. The time of leaving and the return of each wagon is also recorded and twenty dollars in wages is always kept back to insure the return of the wagons in good condition.

In addition to his regular wages the man is paid one-fourth cent per quart for milk sold to new customers; less than one pint of milk is not sold, eggs, butter and cheese are carried as well as milk, by each delivery wagon. Eggs are sold at so much per egg instead of by the dozen. The price ranges from 1.2 to 3.6 cents per egg during different seasons of the year.

#### **The Milk Supply of Dresden.**

The city of Dresden, Germany, claims to have one of the largest and best milk distributing establishments of the German Empire. After staying in the city about three days I was able to gain admission to the premises of this large concern.

The firm now operating the business has carried it on for twenty-seven years and the various buildings together with the 500 employees make a small town of itself. Nearly everything connected with the milk business, except the milk, is made in this establishment. The milk wagons are built in one department of the business. Several repair shops with complete outfits for re-tinning cans and making some parts of the machinery used are fully equipped. A print shop for printing circulars and advertising matter is maintained, and while the principal part of the

business is to deliver 80,000 pounds of milk received from about 250 farms daily, various milk products such as condensed, homogenized milk, cheese, and skim-milk soap are made in this establishment.

Americans would be very much impressed with the lack of what we call modern machinery for handling milk. The milk is pasteurized in large sterilizing vats located on the third floor of the building. These were heated by a jacket of hot water, and the milk is stirred by a paddle shaped stirrer which moves back and forth during the heating. Milk flows from these tanks through pipes to the floors below where it is drawn into bottles or cans which are taken on the delivery wagons for distributing milk to customers.

The milk bottles are tall, rather narrow, oval shaped instead of cylindrical. They have a narrow neck into which a paper cap is placed by means of a machine which seems to work in a satisfactory way. The bottle washing machine requires much more hand labor than modern machines of this kind used in America. The bottles are slipped over pegs like the spokes of a large wheel which revolves in a tank of water. These must be put on and taken off by a man standing in front of the wheel and handling the bottles one by one. A stream of hot and cold water is forced into each bottle through the pegs.

The retail milk delivery wagons are rather large and resemble a sheet iron box on wheels. The driver rides on top of the box and two or more boys have seats which hang from an arrangement like the rear steps which we often see on an American omnibus. The iron box is filled with tall rectangular boxes each having a faucet at the side from which the boys draw milk and deliver from house to house in small cans. Sixty of these milk wagons are now in use and each one of them usually makes two trips per day.

It is quite common for the milkman in Germany to have more than one kind of milk on his wagon: first, mixed full milk from the common supply of the creamery which sells for about

4½ cents per quart. This is delivered in bottles. Second, raw milk for children. This is specially selected from herds that have been inspected and fed as required by the management. This milk tests from 3.2 to 3.7 per cent fat and is sold in long necked bottles at 7 cents per quart. Third, sterilized milk for children. This is the same as number 2, but the bottles of milk after filling are heated to 50 above the boiling point of water in a pressure oven. This milk sells for ten cents per quart. Fourth, skim milk which is sold for one cent a quart. This is said to contain .25 per cent fat.

The central salesroom of this milk establishment in Dresden is most elaborately decorated. It claims to be the most beautiful milk salesroom in the world. Besides the tile floor it has tile walls and ceilings. The tile on the walls are placed in large panels of various designs containing scrolls, bouquets, etc., while a frieze two feet in width extends around the walls of the ceiling. The figures in this frieze represent the various processes of butter making with cupids as workmen. A small lunch room opens off the salesroom and the walls of this room are also decorated with tile which represent farm scenes. These tile pictures are so well made that a person in passing would be attracted and induced to stop and take a look at the room even if he did not care to try any of the milk products on sale.

Besides this central salesroom the business supports forty smaller rooms distributed throughout the city. These are not so elaborately decorated but resemble retail stalls for the sale of milk, cream, etc., seen in every city.

#### **Dr. Gerber's Milk Business in Zurich.**

The Gerber milk test is used very extensively in all European countries where any test is used. Dr. Gerber, who has pushed the sale of his milk test as a business, operates a large city milk supply business in the city of Zurich. After fifteen years of business in various localities in different parts of the city, he final-

ly built in 1905 an establishment costing \$100,000 in which he can handle 20,000 quarts of milk per day. The milk is received from about 500 farms.

The farmers producing milk in the valleys of Switzerland generally live in small villages. The houses are built close together along the street. Each farmer may own from five to twenty cows. These are kept in the stables connected with the farm houses, two farmers often occupying opposite ends of the same barn.

The cows are kept in the stable during the entire year. Grass is cut from the farms surrounding the town and fed green to the cows in the stable during the summer time.

The farmers in these small towns have an organization whose business it is to buy and sell products of the entire town. When Dr. Gerber and any other city milk supply man wants to buy milk, he goes to one of the towns and makes his arrangements with this committee which represents the farmers of the committee. The price to be paid for the milk is agreed upon and the farmers deliver their milk to one central point in the town from which it is drawn to the railroad station and shipped to the cities. The price paid the farmers is about three cents per quart delivered in Zurich.

Dr. Gerber keeps a man employed constantly inspecting the farms from which he buys milk. This man tests the milk of each cow, not for fat but for purity, about once or twice a year. He also inspects the cow stables and the utensils in which the milk is handled at the farm. The custom of keeping the cows in the stables in the small villages makes it possible for this inspector to visit at least thirty stables and inspect between two and three hundred cows per day.

Dr. Gerber has many ingenious arrangements for handling milk in his establishment at Zurich. One of the most striking of these is the storage vats. These are cylindrical in shape. They have very much the appearance of inverted bottles, the bottom of which has been cut off, the milk being drawn off through the neck which is the bottom of the tank. Four of these storage

tanks occupy the space in the center of the building and extend from near the ceiling of the first floor up into the room of the floor above.

The milk as it comes in is run through a special milk cleaner which throws out the dirt and sediment in milk in much the same way as a separator. The bowl is several feet in diameter but it is not run at so high a speed as the separator. From this cleaner the milk is pumped into the second floor where it passes over coolers and then into these storage tanks.

A very ingenious arrangement is provided for storing the milk in these storage tanks when it is drawn off the bottom into the cans from which it is delivered. The milk is retailed from house to house in thirty wagons, about one-half of which are hand wagons or push carts. These are two-wheeled carts that carry one large can holding 120 quarts, and a box for milk in bottles.

The Gerber company has no dealings with the customers to whom it sells milk, but the milk is bought by the man who delivers it. These men are paid \$30 per month and four per cent of their gross receipts. They must be responsible for collecting the bills for all milk sold. This puts the milk business on a much more satisfactory basis than is the case when the owner of a milk establishment must deal directly with the consumer and trust to the efficiency of the men delivering milk to get new customers and obtain his pay for the milk they sell.

#### **English City Milk Supply.**

In England the ruling price of milk is eight cents per quart in small quantities. One English quart is equal to one quart, plus one-fourth pint United States measure. Milk is often delivered three times a day, at 5:30 a. m., 9:30 a. m. and 1:30 p. m.

The milk wagons are called "milk floats." These are one-horse, two-wheeled carts carrying a large brass or tin can which is called a "churn" and holds 18 gallons. Hand carts are also pushed around town by men and on the rail around the top of

these carts many small tin pails of various sizes are hung. These tin pails are delivered to the customer from house to house in the same way as we sell milk in bottles. Some of these pails hold only one ounce. They represent the smallest quantity of a dairy product that I have ever seen delivered. The owner of an establishment stated that it was a great nuisance to handle these extremely small pails but it was impossible to change the custom of the locality in which they had been used for generations. These extremely small pails are used mostly for delivering cream testing 40 per cent fat, each one containing from six to eight cents worth of cream.

The details of receiving, handling and delivering the milk in England are much the same as in other countries. The inspection of the milk by city or county authorities seems to be very strict and milk wagons while they are on their delivery routes are continually being stopped by inspectors for the purpose of taking samples of their milk. The law requires that milk must contain at least 3.0 per cent fat and 8.5 per cent solids not fat. All samples are sent to London for testing at one central laboratory.

At one milk establishment which I visited a system of checking out the drivers was in use that was entirely new to me. As each wagon leaves the central depot the driver must leave at the office a sample of the milk from each can which he takes out on his route. The samples from each wagon are numbered and tested after the wagon leaves the establishment in order that a record may be made of the quality of the milk sent out. This helps to protect the company against the possible dishonesty of any milk wagon driver in case his milk is sampled by an inspector while delivering to customers.

A great deal more could be said on this subject of city milk delivery in foreign lands, but I have already given a brief outline of some of the customs in several different countries and I am sure that anyone who is interested in dairying would find that a study of the milk delivery systems of any large city would be entertaining and instructive.



**Wednesday, January 20, 1909.**

**Morning Session.**

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Mr. Mason, Vice-President in the Chair:—The president cannot be with us this morning. I want to get at our program and get all we can out of it.

I hear it stated here that the land is too high-priced to dairy. That is the wrong impression. This raising and selling grain and selling it year after year is like selling your farm by the wagon load. That will not hold up forever. Dairy farming will enrich the soil, you can make it better each year and pay you good profit while you are doing it. There was a farm in Elgin and the man was always complaining that the business did not pay. One hundred and twenty acres, 2 to 4 cans of milk and kept 2 hired men. That farm changed hands. A young man went on there that wanted to make something. He tilled that farm, and put up a dairy barn lighted by electricity. He kept three hired men and he is milking 64 or 65 cows and those three men and himself do all the work. His milk bill was \$840 for December off 120 acres. You don't hear him complaining about it not paying, and his bill will be more for January. And while he got \$840 worth of milk, he would have 75 tons of fertility to put on his farm. That's worth something, and that's the right kind of farming. If you will dairy it right, you can make it pay on three to five hundred dollars an acre. You got to do some kind of farming different from grain raising. You can't sell off the crops year by year without your land getting poorer. An ordinary farm doubles its capacity in ten years and possibly six.

We have got to do some intensive farming, more to the acre. With a good crop on one side, and a good cow on the other side, we have not come to our limit yet. You take the silo and alfalfa and clover, you don't have to have half as much pasture,

and a small farm can do a good business. You can raise nearly as much on one acre cultivated as you can get from 4 or 5 of pasture, and the cow will do better. She has the same feed all the time. You take the dairymen who turn their cows out in the spring, and nine out of ten do this, and make no provision for dry weather, when the dry weather comes they shrink and get below a profit. You ought to make provision for that dry time. If you haven't a silo, have oats and peas and hold those cows up all the time; keep the milk flow up. They think you can't make milk in hot weather. I have had the biggest flow of any time in the year, by taking care of them then and feeding them right. In the fall there are lots who make the mistake of turning the cows out who are going to freshen, and they will run down, and they won't come in and get started right. Up in our section we are all milk producers. Feed our cows and all the feed goes back on the farm through the cow in the form of manure. You control the price of your market by the care of your dairy cow. That is where you market it.

The three essential points in dairying, good crops to raise for feed, good feeding and then you want to select good cows of the dairy type. Then you want a good dairyman, or it will not amount to much. They should all work together. If you don't give the cow good care, you will not get good results. I won't talk any longer.

Mr. Auten is not able to be with us this morning, but we have a man here who can awaken enthusiasm if any one can. He is assistant pure food commissioner of Michigan and a practical dairyman. I take pleasure in presenting Mr. Hull.

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ADDRESS.

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By

N. B. Hull, Diamondale, Mich.

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Mr. President, Ladies and Gentlemen:—

I have got quite a lot of latitude given me this morning. I can spread out in almost any sort of way, and still be on my subject.

Selection and care of cows, and feeding. That pretty nearly covers the whole field of dairying; if I talked about milking and making butter I would have the whole field.

If I succeed in getting over this field that has been assigned to me in anything like reasonable time, I shall have to accept the advice of a certain parrot. Two fellows graduated from a college in the east and were room-mates and friends there. After graduating, they sat down to consider earnestly what they would make their lifework. They had been equipped thoroughly, and the question was, what to go into. They talked the matter over very thoroughly and one said, "I believe the ministry is good, they do a lot of good, I will study for the ministry." The other one said, "I will try something else." The one fellow studied at a theological seminary and graduated and had a call to New York. The other one shipped as a sailor, and was quite successful, and finally became a captain of a ship. They both loved birds, and they both bought a parrot. You readily see, a parrot that learned to talk in a minister's home and associated with deacons and deaconesses would learn a different line of talk than the parrot on ship board. One time the captain ran into New York, and thought he would go and see the minister. "Why not take my parrot to visit with the minister's parrot." He hung

his parrot near the other one. The men sat talking in the corner. The minister's parrot cocked up his head and he looked the other parrot over, and the sailor's parrot looked the minister's parrot over carefully to. There was silence for a few minutes, and then the minister's bird said: "What shall I do to be saved?" The sailor's bird said, "Pump like hell, or go to the bottom."

Now this morning, if I could anywhere near cover the ground, I've got to pump.

The selection, care and feeding of cows. These are the three legs upon which successful dairymen must stand. We must have a good cow to succeed, and I want to say right here, there is a whole lot of difference in cows. Some cows have natural ability to profitably produce dairy products, and other cows have not that ability. They are not to blame at all either. They were simply not born with the ability to convert feed into milk. Before I go any farther, if at any time you want to ask questions, just ask them. If you think I am saying something that is not true in Illinois, and it is true in Michigan, say so. If I make an assertion and you don't agree with me, why say that. Say it pleasantly if you can, if not, say it anyway. If it comes to that we will have to scrap it out.

You understand that what I know about dairying primarily, I learned from rubbing up against the dairy proposition. I handled the cows. And you gentlemen, who have handled cows here, attended the same school. If you got results, your experience is just as good as mine.

There are three kinds of cows I believe in this state. One kind takes her feed, eats, digests and assimilates it. In some way her temperament, or inborn tendency, call it what you will, prompts her to take this assimilated food and convert it into flesh. That cow is a beef cow. It makes no difference whether, Holstein, Guernsey, Jersey, Ayrshire, Shorthorn, Polled or Hereford, if she converts that food into flesh, she is a beef cow, and make beef of her just as quickly as you can. To be sure, she will

give some milk. The instincts in her, made by God, will prompt her to take care of her little one. Feed that cow a good generous ration and she will get fleshy. If you have a beef cow in your dairy herd, get rid of her.

Another one digests her feed and because of something in her temperament, or tendency, instead of converting that into flesh, she will convert it into milk. That cow is a dairy cow, and it makes no difference what her breed, or, in other words, she may be a Guernsey, Jersey, Holstein, Shorthorn, Polled or Hereford, if she has that temperament to convert that feed into milk, she is a dairy cow. I want to say to you men of Illinois, you better get her. She will do more to enlarge your cash income, and maintain the fertility of your soil than any other animal on the farm.

There is another kind of a cow, which eats and digests her food and God only knows what she does with it. She is of no value to any one. I will illustrate these propositions. I was in a barn in Michigan not long ago and stood behind a row of cows. The owner weighed the milk from every cow twice a day, tested once a week, weighed the feed and knew just what it cost him to keep each cow, and what she paid for her keep. He pointed out two cows and asked me how much difference there was in the profit from those two cows. I told him I didn't know. I can't tell from the looks of a cow, so I made a guess the right hand cow was the better cow. The right hand cow gave ten times the profit the left hand cow did. What does that mean? Just suppose Mason and myself had farms along side by side. He had cows like the right hand cow, and I had cows like the left hand cow. Mr. Mason would have ten times as much profit in a year as I would have. Not only that, it means that for nine years yet I must grow crops, feed those cows and milk them, and after ten years I would have no more than my friend would have in one year. I must put in ten years of my life to accomplish what he had accomplished in one year. Why? Because he had better cows. I maintain as farmers and dairymen, we are putting in two, three, four, ten years to accomplish what we

might do in one year if we knew our cows, did we practice good business methods and kept the good cow that had natural ability. Life is of too much value to put in ten years doing what we ought to do in one year.

They tell me there is no money in dairying. Perhaps there isn't any money the way some do it. I went to a local creamery in Michigan to find out how many cows each patron kept. I figured with them to know how much they fed their cows and the value of it, and got as nearly to it as we could. Then I went back to the creamery and they let me see the books to know how much each man received. The lowest was \$22. I turned to his sheet and found that for every dollar expended the cow returned 76 cents for it. That man put in his time growing feed. He fed it to the cows and milked them and only received 76 cents for every dollar invested. Another man received \$79 per cow. I looked at his sheet and for every dollar put into that cow he received \$1.95 back. There were two men dairying, both sending their milk to the same place, and one received \$22 per cow and only 76 cents for every dollar's worth of feed, and the other man \$79 per cow and \$1.95 for every dollar's worth of feed. What was the difference? Let me say, these men lived a mile apart. One man had good cows, fed them good and the other did not. I am here to tell you that dairying is a good business. In this particular case, one man was putting intelligence into his business to make a success of it, and the other was not. I recommend dairying to you, but if you don't care to make a success of it, don't go into it.

Just one illustration in regard to these cows. No argument in this, but as Mr. Mason suggested, we don't do as well as we know. If I can give you any help I will have earned what the Illinois Dairymen's Association have to pay me. My advice is, go home and do as well as you can, and then find out how to do better. Several years ago I went to lecture to all the patrons of a Michigan's man's cheese factories. A few years later I went there again and talked on selecting, feeding and caring for

cows. The owner says you have talked to them before and some are doing better and some are not. He wanted me to think up some scheme to wake them up. The next morning before I commenced he asked each man how many cows they delivered milk from the year before. He found the lowest man delivered 2,800 pounds of milk per cow. Some 3,000, 4,000, 5,000, 6,000, and 7,000 and up to the highest 8,700 pounds. These two men lived near together, 2,900 and 8,700 pounds. The man whose cows had made the poor record sat near me, and he dropped his head. When he said, "If you had cows that would only give 2,900 pounds what would you do with them?" I told him if I had given those cows a decent chance to give milk and they only gave 2,900 pounds, I would sell them awfully quick. He wanted to know if I would sell them to my neighbors. I said, "If you have a neighbor that you don't like, if he is a mean cuss, and you want to get even with him, you couldn't do him a worse trick than to give him those cows." Then you can sit on your back porch and see him working in the field laboring to grow crops to feed those cows that will take a dollar's worth of feed and only return him 60 cents, and that is discounting the value of that man's life by 40 per cent, and that's a mean enough trick to come on any one. I don't tell this so you can get even with your neighbors. The purpose is just this if it would be a mean trick to give a neighbor such cows, then a man is coming a mean trick on himself and his family if he keeps them. There are a whole lot of fellows in Illinois that are coming just such mean tricks on themselves and families, maybe right here in Clinton, but there is no one here like that this morning.

#### How to Select Cows.

How to select these cows. We want a cow that will take our feed and convert it into the most profit, because if we are putting in a part of our lives feeding cows and milking them, the value of that part of our life is determined by the amount of

profit that we get out of those cows. There is no question about this. The man who makes the chief end of life getting dollars makes mistakes. But when he sets out to make a success of his business for the purpose of accumulating something that he may provide himself and family with the comforts of life, educate his children and provide against old age, he owes it to himself to get just as large profits as possible. We want our cows to take their food and convert it into the most possible amount of dairy products. How are we to know? Shall we select a spotted cow, or some other color? No. Color makes no difference. It is the cow that will take her feed and convert it into the most product. How are we to know? Shall she have sloping shoulders, large udder, good milk veins and all that? Yes. But then I want to know something more about her. The cow is a piece of machinery to take our food and convert it into a product. We have learned something about the confirmation of that machine that indicates its temperament. But outward conformation may be right, and something wrong with the inner works.. Occasionally we find that some of these cows have the right confirmation, and not the ability. Go a little farther. Its like the horse. When the man was looking for the fastest horse, he picked out Dan Patch because he was built right. How fast could he go was asked. You could not tell. But there is one way you can tell. Get up behind that horse and drive it. That's common ordinary horse sense. Apply the same sense to this proposition of the dairy cow.

In the matter of production. When you feed that cow, know what she is paying you for it. The common ordinary dairyman can be his own clerk, you don't need a bookkeeper, that is all nonsense. I never had a bookkeeper and never spent such a great lot of time with a pencil. What time I have spent has paid me best in the dairy proposition. We do not have to be like Prof. Fraser of your university when he makes an experiment. He has to show you people just exactly, but you and I on the ordinary farms have not got to know to the fraction of a cent. Once in



ten days weigh the milk, morning and night. Multiply by ten and we know near enough how much that cow is giving in milk. If in the butter business, go farther and test it occasionally, at least three times a year, and better yet, once a month to find out how much fat is in the milk so you may know the value of it. Then you must know about the feed. It don't take much time. I go in the barn when the cow is being fed and pick up the hay and weigh it. From that to another one, and so on. I know the value of that per ton, and it only takes me a short time to know the value. Will the man feed the same? I don't know. He may feed a little more or less, but I have the average feed. I will do the same with corn stover and the ensilage for the grain I use a small measure and know how much that will hold and what it weighs. Over each cow is a file 1, 2, 3, 4, 5, 6, that shows how many each cow can be fed. Thus I know what it is costing me.

The question the men always ask, "Does it pay?" Two young men in my country were dairying, one on one side of the road, the other on the other side. They were told not to go it blind, but to know what they were doing. It appealed to one young man. He bought a scale and a test and paid five dollars for the two. He took time enough to weigh and test the milk. At the end of the year he knew very nearly what every cow was doing from his record of feed and what they had paid for it. The other man said if he fed his cows it was all the time he had. What was the result? After three years, one got 250 pounds of butter per cow, and the other got 200 per cow. Which got the 250? It was the man who got rid of his poor cows. The other one had the same chance to do that work, but did not want to do it. One got 250 pounds and the other 200 pounds. It required the value of the first 150 pounds of butter to feed those cows and take care of them. The result one man had 100 pounds of butter profit, and the other one only had 50 pounds profit because he would not take time to find out. That young man made the worst mistake of his life, he didn't have time to know

his business. The worst of it is, he will have to take time to make up for what he did not know. He must take care of them for another year, and then have only the same as his neighbor had in one year. He put in two years to accomplish what his neighbor accomplished in one year. We cannot afford to be so busy that we cannot take time to know our business.

In one of the southern Michigan towns I met two young men and talked same thing to them ten years ago. We went into the details of this proposition and they started to practice it. I was there two years ago, and these young men were there with a record of cost and how much each cow had paid for feed. The records showed the first year they got an average of 184 pounds of butter per cow. Some went above 200 and some only above 100. They sold off the cows that did not pay, and got better cows. They studied how to feed and care for them, and when you begin to figure on this you will look at the little things that go to make success. Their average was 184 pounds of butter. After eight years of that sort of work, what was their average? 376 pounds of butter per cow. They started with 184 pounds and worked up to 376. How much more profit was there in one year to those men getting 376 pounds than when getting 184. They were making more clear money in one year with 376 pounds, than they made in 10 years when getting 184 pounds. Consequently by knowing their business they had multiplied that part of their life by ten. No investment a man can make that pays him so well as to know his business, and be able to multiply the value of his time by 10. That cow that pays you the most for a dollar's worth of feed, and at the end of a year made the profit, is the cow that it pays you to keep, and you cannot afford to keep the poor ones.

#### **Feeding and Care.**

Many a cow in Michigan, and I presume in Illinois too has been condemned as a poor cow because she never has paid a profit, or only a small profit, when the cow was not to blame for

it at all. They never gave her a good chance. Over in Michigan there is many a good man, well-meaning man, takes up his Bible and read the story of that man Pharoah who set the children of Israel the task of making bricks without straw, they had to gather stubble where they could and their tasks were not lightened. And they wonder at the injustice of it all, yet these same men will turn around and expect their cows to give milk without the proper kind of food and care, and do the same thing Pharoah did, but the cows can't do it either. You got to feed them and feed them the right sort and take good care of them, if you expect them to do their work, and they do it gladly if you do your part.

We hear a great deal about a balance ration and it is all right. I want to tell you the first great fundamental principle is to feed all she ought to have. Over in Michigan, dairying is not as profitable as it ought to be. There is an average of 145 pounds of butter per cow, and your average in Illinois is right there 145 or 146. And they say to me "You claim that dairying is profitable, but how do you make it out with 144 or 145 pounds per cow per year." I says "that is all right, but my friend how much does the average cow get to eat?" Statisticians have figured in regard to that, and we found that we feed from 25 to 28 dollars, the value of the feed that the average Michigan cow gets. I have been over and across this state and looked at your cows, and from the appearance of a lot of them I should infer your average cow in Illinois probably did not get over 25 to 28 dollars either. What are you expecting? Expecting her to make bricks without straw. Why? Because it requires for the average cow from 18 to 20 dollars' worth of feed just to keep her a cow, that is if you furnish her good pasture, charge her what it is worth, hay at the market price, all the feed she eats. If you start out the first day of January with a dry cow and until the first day of the next January, it will cost you some eighteen or twenty dollars to do it. But we want them to give milk. It takes \$18 to \$20 to run the machinery, a maintenance ration. If you feed \$25 worth of feed and it takes twenty dollars' worth of that to run her

machinery, and she converts five dollars' worth into milk and you expect it to pay for the whole thing and make a profit. Bricks without straw—and she can't do it. I tell you the first great principle of successful feeding is, feed all she ought to have to eat. With any other machinery he knows the great successful principle of running that at a profit is to run it up to its full capacity.

When I first commenced dairying I was feeding about \$28 worth of feed a year. It took \$18 just to run that machinery and had an average of \$40 worth of milk. There was \$28 worth of feed, \$18 went to run the machinery, which left \$10 worth of feed to convert into milk and made \$40 worth of milk. There was \$12 a cow a year profit. A lot of men in Michigan made more, and if the other fellow was doing it, I could do it too. These cows I say only gave \$12 profit and that was not enough. I began to study, and I came to the conclusion that if I was spending \$18 to run a machine and that machine was only converting \$12 worth of feed into milk, either I had a poor machine or I was not handling it right. I commenced to study how to get that machinery to do more work and came to certain conclusions. The first conclusion was that the cows must be fed regularly, at the same time every day. The next proposition, she must be fed a variety of feed. I have been asked if that is true or not. Just stop and consider the proposition. I like fresh pork, but if my wife insisted on having it for three months straight, I couldn't live with her. It is good enough feed, but we cannot do a good day's work with but just one kind of food. It may be one thing or the other. I don't believe a cow can do it either. She wants a fairly good variety if she is to do her best. Then she wants palatable food, and if any man was to ask me this morning what was the most essential thing about feed I would say palatability. The stuff that tastes good to her like clover cured right, cut just in bloom. I built a silo, because I never yet have found any sort of roughage as good as sweet silage. I said over in Michigan if there is a natural born stockman, you can tell him when he watches his cattle eat. They like to

see the cows take hold with a vim to their feed. I built a silo and feed silage. I keep everything clean. I keep the manger clean so that when I put that good food there they like it. It would induce them to eat all they possibly could. When I feed them regularly a variety of feed, palatable feed, and keep the mangers and quarters clean, instead of their eating \$30 or \$28 worth of feed, I get them to eat \$38 worth of feed. Last year it cost me \$41 to feed the cow, the year before \$39, before that \$38.47, but just let me drop a hint. Men say that feed is getting so high it does no pay to dairy. Dairying has been going up in Michigan as in Illinois and the profits the same. Three years ago when it cost me \$28.47, I got \$90.16 worth of products from each cow. Next year when it cost \$39, I got \$92.70 worth of product. This year \$41.00, I got \$100.16 worth of products. So you don't need to be scared. Get better cows, give them better care and handle them to get the products out of them.

Now let me go back to that feed proposition. When I fed \$28 worth of feed, I got \$40 worth of products. Now by feeding those cows regularly a variety of palatable feed I used \$38 worth of feed, what more does it cost me to run that machinery? Practically the same. The cost of running that machine is practically the same. Then I got \$10 worth to convert into milk now I get \$20 to convert into milk. On the average I am getting twice as much dairy product. Now I am feeding \$38 to \$40 and getting \$90 worth of milk, I am getting 40 to 50 per cent more. Over in Michigan more men are lying awake nights over the proposition of how to get their cows to eat more, and they are losing out on it. Just let me illustrate by taking another piece of machinery. Supposing it was a threshing machine charging two cents a bushel, 500 bushels he gets \$10, just enough to run the machinery. He could thresh until he was as old as Methuselah and never be any better off, because he is only running enough through to pay for the operating. Suppose he runs 750 bushels how much more would it take to thresh that than the 500

bushels. A little more fuel in the boiler, but they get \$15, a practically \$5 profit. They want to thresh 1,000 bushels and they can just as well as not and then they would get \$20. How much more would it cost to run it through that machine. A little bit more fuel, a little more attention to the belts and pulleys. But the cost has been practically the same. When threshing 500 bushels no profit, when 750 bushels \$5 profit and when 1,000 bushels there was \$10 profit, just as much again. You take it in the matter of profits in dairying or farming it takes considerable of the first product just to pay for the cost of the production and only a little more will double the profit. It is just so with the dairy proposition. It is as true with a piece of dairy machinery, with the cow as any other machinery, if run to its maximum capacity you get the largest profits. Think of this, regular feeding, variety of feed, and keep things clean.

By Mr. Lee:—I was going through on Illinois Central to Springfield about ten miles west of here not long ago, and was looking out of the window. On that morning it was cold, and out there in the cornfield a man was trying to milk some Jersey cows. Would he make any money under those conditions?

Mr. Hull, A:—Well if he is, there is a lot of fellows making money in Michigan and Illinois.

Care:—I was riding across Michigan a year ago with a gentleman and it was a cold winter's morning. We saw on the left side of the road a herd of presumably dairy cows, and looked across the road, and there was the owner, buildings, barn, fences and the house, and they really looked like the last remnants of Ricketyville. He says to me, "There is an illustration. Here's the result of his way of doing business. And you can set that right down as a principle in dairying, when you see dairy cows out those bitter cold winter's mornings, and the man's advertising a system of dairying that means house, barn, fences and everything else is going backward.

There are two things that a man should ever keep before him in caring for cows. The first thing, keep them healthy, and the

next proposition, keep them comfortable. In the way of keeping the cows healthy, on my farm, I keep my cows in a barn, and a covered barnyard, that is sided up with a good roof and windows and a cement floor, and those cows, from the time they come in in the fall until spring, are never out from under that roof and never out where the wind strikes them. I believe that those cows will be more healthy than if taking exercise in the open air in all sorts of weather. But the barn is well lighted and well ventilated, and I can see no reason why cows kept comfortable, if furnished with good quarters should not be healthy. My experience, and the experience of other dairymen whom I know, leads me to believe that those cows will be healthy. When you furnish them with a well lighted, well ventilated place, you are doing your part. Keeping them clean, of course, will help to keep them healthy. Give them a chance to do their work, by keeping them comfortable. That means the stable shall be reasonably warm. A cow ought never to be outdoors in the winter, when her owner cannot be out without feeling chilled. Men have said to me they can't stay in, that a cow is naturally used to the cold. The natural cow may be used to it, but the natural cow freshened in the spring and went dry in the fall, she gave enough to support her baby and quit. Turn your cow out if you want to, she won't freeze to death. She will use your feed to keep warm if you want her too. If you want to warm all out-doors, do it. If you want her to take that feed and make the most possible profit, you got to keep her comfortable. The first great principle of maternity, and the man, who is in the dairy business, is practicing upon the maternity of the cow, is that mother must be kept comfortable. She must be kept comfortable if she is to generously yield this life giving fluid. Some men say to me in Michigan, and I think, perhaps, some think it here, that it is all right for me to talk about comfort. I have a covered barnyard. I want you to understand I never would have had it if I hadn't made those cows earn it. I commenced dairying in a little shed. But building paper was cheap enough so I could afford to house my cows

comfortably. Window lights were cheap enough and so they are today, and I could afford to let in the sunshine. If you can't afford to do anything else, cut a hole in the end of the barn and put muslin over it, it will furnish your cow with fresh air, and that is all she asks. Make that little stable warm and comfortable. If you put in window lights and ventilate it to let in the fresh air, that is all she asks. Feed her generously, and she will turn in and help you get the money.

Over in Bay County they have just gone into dairying in that section. A man told me how much his cows had made him. I went over and stayed with him, and went to the barn. He had a log barn, but it was warm, well lighted and well ventilated. I asked him where he watered his cows, and he told me if it was not too cold, they went to a spring, and when it was too cold he carried it to them from the house, a man 70 years old. "Quite a job, isn't it?" "Well, yes, something of a job. I have a boy 25 years old, his wife is here with me. He is over in the lumber camps working for \$25 a month. I am 70 years old and am making as much clear money as he is in the lumber camp. I could not make money on those cows if I let them out in the cold to drink."

I thank you very kindly for your attention, and remember that the dairy cow is a profitable animal, and I want to second Mr. Mason in what he says about high-priced land. The higher the price, the more you want to maintain the fertility of that land. You have got to turn to dairying, and that cow will turn those products into more cash, and return a larger per cent of the fertility to the land than any other animal that walks. But you must have a good cow and give her good feed and good care if you want to succeed.

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**Wednesday Afternoon, January 20, 1909.**

**1:30 P. M.**

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Vice-President Mason in the Chair.

We will listen to a song by Mr. Lumbard. "Child of a King." Encored. "Maggie."

We will now listen to Mr. Newman, whose company operates forty creameries in Wisconsin, Northern Illinois and Iowa, and wherever "Springbrook" is known. It is known for its high standard. Let me present Mr. Joseph Newman of Elgin, Illinois.

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**ADDRESS.**

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**By**

**Joseph Newman, Elgin, Ill.**

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Mr. President, Ladies and Gentlemen:—

The subject they have given me this afternoon is pretty deep. I hardly think it will entertain the farmers, but they will have to follow it on the lines I have worked it out on and apply it to any practical line of farming, whether feeding steers or growing crops. It needs accuracy to perform all of these to the best advantage.

"The Value of Accuracy in Creamery Work." Accuracy, what does it mean? Webster gives as this definition, "To take

of, state of being accurate—Freedom from error—Correctness—Exactness—True—Accuracy of calculations (but not as strong terms as exact—precise).

How well the subject, as defined by Webster, fits in to the life of a right up-to-date butter maker. "To take of." He is placed in custody and control of a plant costing from three to ten thousand dollars, in charge of the business of 50 to 200 farmers to take care of it all. It is a great responsibility to do it right, and he must keep himself in the "state of being accurate," not guessing today, and weighing and testing tomorrow. By practicing accurateness daily he will soon get into that condition whereby his work will show "Freedom from error," his correctness will be commented upon, and the "exactness" in which his reports come to headquarters will show to those by whom he is employed that he is "true" to his calling and capable of doing greater things. It is a virtue that brings not only satisfaction here and now, but the promised reward of the future.

Accuracy in all work is necessary, and should be our aim, as it is only in doing accurate work that you can determine the value of anything. My subject confines me to creamery work. This subject is very broad, and it will be very difficult for me to determine its value other than in a general way.

Now, the first thing a buttermaker has to do, in entering a creamery, is to get up steam. This necessitates his opening a handhole or manhole of the boiler to see that all sediment is removed, then filling the boiler with water, to say, about inch above the top row of flues in a horizontal boiler. Wherever that may come in his gauge glass, a mark of some character should be made, so that at a glance at any time, will always show him whether his flues are covered or not. Then a slow fire should be started until the required amount of steam is shown by the steam gauge. With a pop safety valve set at 80 pounds, he can very soon find out if his gauge glass is in working order. He will then note where any leaks are in the pipes or valves, and the pipes are run to drain out well. If any leaks are discovered, the steam

should be shut off at the main valve in the boiler, and these leaks remedied. With this attended to, he is ready to clean up the factory, which is one of the essentials of doing accurate work in an up-to-date creamery. The sanitary part of producing dairy products is receiving more attention every year, and as vessels used in the handling or manufacturing of them should be *scrupulously clean*. I cannot impress this on the dairymen any too forcibly.

The next point is to test all the receptacles into which the milk and cream goes to see if they leak. If they find they do, these should be remedied, as, for instance, a leaky vat is one of the worst things that a creameryman has to encounter in trying to have his butter of the best flavor. Also from the financial end of it, leaks cause loss, but that is the least consequence from the standpoint of this paper, as cleanliness and flavor are the aims for which we all must strive.

The engine should now be looked over to see that the boxes in the cross head and on the crank shaft are good and snug. Oil should be in the *cups*, and the engine started slowly and gradually up to speed to find out if the several machines have their proper pulleys and belts to give them the required speed for doing **accurate work**.

With this accomplished, we are ready for business, and an intelligent buttermaker will be on the receiving platform with a "Good morning," ready to receive the milk or cream from his patrons. Each can of milk or cream should be carefully inspected, both for quality and flavor. A buttermaker who has been *educated* in the business properly can do this very quickly, by the lifting of the lid of the can to his face, he can tell with one sniff whether the flavor is what he likes or not, and with his Babcock tester he can tell the quality. In either case, if he finds it not what it *should* be, he should inform his patron in a gentlemanly way how the defects can be corrected, and show a desire to help him overcome the difficulty. His advice may not be received pleasantly the first two or three times, but he will finally gain the confidence of *the* patrons so that his suggestions will be carried

out. It may take a whole season to do this, but he will finally win out if he keeps everlastingly at it.

This may be a hard thing for young men, especially for those just coming from the *University*, and who may have an idea because they hold a diploma from some large college they have all the knowledge that is required for a first-class creameryman, and that a farmer should take his suggestions the first time without question. But they find out *before* they have been in the business very long, that it takes years' of experience to overcome these difficulties, and get the products of the cow brought to them so with their other work they can produce a quality of butter that shows their work has been done *accurately* at all stages. Hence my advice to them will be, not to get discouraged, if the farmers do not see things as they do the first few months. In this connection the Babcock test is an important factor, but it needs fair samples and correct *handling* to give true results.

We now have the product of the cow in the factory, and it is up to the buttermaker to do the rest. He, of course, must be furnished with proper machinery and utensils to do the work accurately. In the case of milk, it *must* be heated to the desired temperature to get the best results in separating, so that the loss in the skim milk is nominal. The cream from the separator should be cooled down, and a sufficient quantity of good starter added that has been prepared in the *usual* way. *In the winter* time this is most important, as there are very few creameries but what receive their milk at that season of the year only two or three times a week, hence the starter is the most important for the buttermaker to *do* accurate work.

In judging butter, flavor counts 45 points out of 100. A buttermaker must necessarily protect himself ahead for this starter milk. He must have it, even if he has to pay two prices for it. As my subject is not buttermaking, I *will* only touch on the points to show the need of accuracy at every step in the manufacturing of dairy products.

The next will be the acidity of the cream. This must, of course, be determined by some reliable test, and not be trusted to the buttermaker's taste. The foregoing is *true* in regard to hand separator cream, as it is of the cream from the milk brought to the factory and the churning of it must be done as carefully as the other work has been done. The churn must be stopped at the point where the fine granules show, the buttermilk *drawn* off, and the washwater of such a temperature as will incorporate with the proper amount of sale for the desired amount of moisture.

This point is a very important one to the buttermaker of to-day. There was a time when some creameries taught their *buttermakers* to incorporate all the moisture they could, but they got into trouble with the authorities of the old country, whose standard was 16 per cent, and some of this butter had to be returned to America, which was not a very good advertisement for this country. The lawmakers finally made a law covering this, which now stands at 16 per cent moisture as the standard of this country, and all butter found containing more than this amount is held under the pure food law to be adulterated butter. All butter so found is *seized* by the government and the \$600 tax is placed against the factory in which it was made, and 10 cents a pound further tax added for every pound of the butter so found containing over the 16 per cent moisture. As butter is shipped once a week from *creameries*, a factory making 1,000 pounds a day, when caught, would have to pay the government \$1,300 and probably lose the butter also, which at present price would be another \$2,100, or a total of \$3,400. This amount should be large enough to warrant *every* buttermaker in educating himself to control the moisture below 16 per cent limit. The test should be done while butter is still in the churn. The "Irish" test is the one generally used, and must be done accurately of course to be of any use. I advise *buttermakers* to make their standard 15 per cent, then if their scales are out a fraction, they will still be well within the 16 per cent limit.

### Marketing the Butter.

We are now ready for the package in which to market the product. If tubs, they should be clean and well soaked in a good brine, lined with parchment paper. The butter should be well packed and the top finished off level, covered with a cloth with a sprinkling of salt on top. The buyers are critics, and if the package and finish look good to them, you have their good will to start with, and *it* sometimes offsets slight defects in the grade.

One criticism I want to make on trying butter, from a sanitary point of view. It is almost universally the case in boring butter to draw out a sample on a tryer. After looking it over, smelling of it, biting into it *here* and there to taste it, pulling a finger over it to find defects, they then put the balance into the tryer and put it back into the tub in same position as near as possible as it came out. Cannot accurate sampling or testing be done by cutting out *pieces* to taste, and thus not bite into the mass, and expect some one to buy and eat the other part with the imprint of the tester's teeth on it? It does not look or sound good to me. If the butter is put into prints, they must be square edged, and cut to weigh right, *wrapped* with the parchment wet and so the brand will show even and in place. If the shipping instructions are given correctly, and the railroad receipts reads as you wish it, it is up to the railroad company to deliver it with neatness and dispatch.

When the butter is made, the creameryman will need to give some attention to his accounts. He should know how many pounds of cream or milk he has taken in; how many pounds of butterfat in it; then how many pounds of butter from the *churn*; what his overrun is; what his moisture test is. All this should be reported daily, that he may know he is doing his work accurately. There is altogether too much guess work going on in the creameries and while, in some cases, the quality of butter may come *out* all right, yet in the yield such a loss occurs continually that the creamery doors are closed, while if up-to-date methods are used and "accurate calculations" are made along the line,

cutting out the guesswork, the creamery flourishes in the town, and is one *of* the best mediums of converting the raw product of the farm into cash. Hence these should be fostered and helped by farmers, tradesmen and the public generally. The cash from the dairy part of farming comes weekly, while from the cattle and crops once a year; and, not only that, but after selling the milk and cream, you have the cow left, and she will return to the soil, if you feed and bed her right, more soil fertility than you have taken from the soil to feed her. Thus it is a class of farming, if carried on *accurately*, that will allow each generation to hand down the "old farm" to the next generation with its ability to grow crops unimpaired.

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ADDRESS.

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By

S. B. Shilling, Chicago, Illinois.

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By the President:—We will now listen to a speech by Mr. S. B. Shilling of Chicago, who is President of the National Dairy Union, a dairyman farmer and who believes in having a silo. I take pleasure in introducing Mr. Shilling.

Ladies and Gentlemen:—I will confess to you as I stand before you, that I feel somewhat in the air. That is, I hardly know how to talk to you. I probably feel a great deal like the old farmer did, who had been reading in the newspapers about the wonderful accomplishments of the Wright Bros. in their air ships. He turned to his old wife and said "Gosh Marthy, those Wright fellows think they are great, when they go up in the air

and stay there for an hour, why there's our Wm. Jennings Bryan that has been up there ten years and has not come down yet."

I do not altogether like the introduction I had at the hands of your president. I am just plain Sam Shilling and a farmer like the rest of you and probably have not done any better than many of you and not so well as some. I am not presumptuous enough to think that I can instruct you on anything. I am going however, to try and tell you the truth in what I do say at least and I will be more truthful than the fellow who was relating about a tree that was cut down on his father's farm and the rings indicating the years of growth showed the tree to be over one hundred years old. When it was split open, in a cavity in which there was no opening whatever, was found a snake about twelve inches long which was alive and well and in relating this, he asked of some listeners of how they could account of this. One of them spoke up and said it was easy, that it was an easy matter to explain and being asked how, why he said "that's a damned lie." I am going to be more truthful than that. Now if I can say anything that will arouse in you a spirit of investigation or if I can get you to thinking good and hard upon dairy matters, I will feel that I have accomplished all that I came here for.

The only time that I ever said anything that I was positive did any good, was when I was addressing a body of farmers over in Iowa a short time ago. While I told them nothing but the truth I overheard a farmer turning to one of his neighbors and say, that he believed that fellow was the biggest liar he ever listened to in his life and he was going home and try some of his cows and find out whether it was so or not. You see what I said had already set him to thinking and he promised to go home and investigate. Now I understand that you farmers in this locality are not at the present time dairymen. That is, that you are not extensively engaged in the dairy business but your presence here this afternoon, indicates the fact, that you are desirous of becoming dairymen. I am not going to tell you, that if you engage in the dairy business, you are going to become suddenly and immensely rich because you will not, but I do want to say



to you, that there is not a branch of agriculture today that will return you as much for intelligent work as will the dairy industry and the measure of your success in the industry will depend upon the amount of intelligence you put into it. The possibilities of the dairy cow are almost boundless and the amount of money that can be made out of dairying, if it is conducted in an intelligent manner so far as breeding and feeding are concerned is almost limitless.

To illustrate this, according to the report of State Dairy Commissioner Wright of Iowa the cows of the state only return about 150 pounds to the cow. Now at the price of feed, it is an easy matter to figure out that there is not a dollar of profit in keeping cows of this kind. Compare the cows of Iowa with that wonderful cow from Wisconsin "Colantha's Fourth Johanna," that was on exhibition at the National Dairy Show in Chicago, that gave in one year 998 pounds of butterfat. Think of the difference between 150 and 998 pounds. I give you this simply to illustrate the possibilities of the dairy cow. While it may not be possible for all of us to produce cows like this, there are any number of farmers today who have herds of cows, that are producing 200, 300 and even 400 pounds to the cow and if it is possible for one man to do this, it is possible for another to do the same thing.

Now this is not the only reason. Mr. Newman in his address hit upon a very vital point when he referred to the conserving of the fertility of your soil, and this is a subject which I believe is of the greatest importance to you at the present time. I take it that you are largely grain raisers and that you are selling this product from your farm. Now did it ever occur to you, that you can not always continue to do this. Did you ever sit down and reason and think what you were doing when you were selling the grain from your farm? Did it ever occur to you that some time you have got to put this fertility back in some shape? Is it not good common sense to know that you cannot sell wheat, oats, corn and hay and still keep that land of yours productive? Do you know that every time you sell a ton of wheat you dispose

of about \$8.45 worth of the fertility of your soil at the present price of commercial fertilizer. That every time you sell a ton of oats you are selling about \$7.25 worth. Every time you sell a ton of corn you are selling over \$5 and the same amount on every ton of hay. To me, this is a serious matter and one that affects your interests greater than you at the present time have any idea. What is your land worth here? (Answer by farmer, \$150 an acre.) Now are you getting interest on \$150 acre land? If you are not, then your land is not worth \$150 an acre and the price of it will have to come down so as to pay the owner interest on its correct value. Farming is a business proposition just like keeping a store or a bank. You must make a profit on the money invested in order to retain its value. Now in order to do this, you have got to produce more crops, better crops and something that will go farther than you are producing at the present time.

I have predicted for the last fifteen years and I think events will bear me out, when I say, that you will never see the time in this country when butter will again be a low price and I will make a further prediction at this time, that you will never see a time when you will see a low price for food and feed products, but this is not a good thing for the farmers for the reason, that the temptation to sell these products will be so great that you will continue this process of selling the fertility of your soil.

We have got in the United States about 85,000,000 people and in the last year, we only produced about 3,734,000,000 pounds of butter. The increase in our population for the last three years has been about 7 per cent while the receipts of butter at our four leading markets for the same length of time is 8 per cent decrease. Now according to statistics compiled by the secretary of commerce and labor, who was investigating the amount of food products consumed by the laboring classes, found that the average man where the price of butter was within the reach of an ordinary salary, consumed about fifty pounds a year. Now take our entire output of 3,734,000,000 pounds with our population of over 85,000,000 and it only allows about twenty pounds to each individual. You will see that we are not producing much more

than half enough butter to go round, providing the butter was fine enough and the price was within the reach of all.

I told you of what it costs of the fertility of your soil in selling off your grain, but I failed to tell you, what it cost to produce a ton of butter. Now according to the estimates made by agricultural schools, who have thoroughly investigated the matter, it costs but fifty cents a ton of the fertility of your soil to produce it and if you care for and return the manurial value of the dairy cow back to the lands again, you are increasing the fertility of your soil instead of decreasing it. You can go into the dairy sections of the old dairy states, and you will find this to be a fact, that where they are extensively engaged in the dairy business, they are raising more corn to the acre, more oats to the acre and in fact more of all kinds of crops than they did ten or fifteen years ago.

Now I want to talk to you a few minutes about the dairy cow. The opinion seems to be quite general in a country not engaged in dairying, that it is necessary to go in to thoroughbred dairy cattle. This is a mistake and one that has resulted in great injury to the industry. I want to say to you, and I speak from observation and experience, that in your native cow you have the very best possible foundation for a dairy herd. I do not wish to be understood to be arguing against thoroughbred cattle, for I believe in them, and I want to say to you, that you should head your herd with a thoroughbred registered sire and he, the very best possible for you to obtain. I wish I could urge the importance of this strong enough so that the very first move you would make in the line of dairying, would be to secure an animal of this kind. The facts are, that you cannot afford to keep any other kind of a sire and if one of you is not able to purchase an animal of this kind, two or three of you should go together and do so.

You probably never had much experience with breeders of thoroughbred cattle, if you have not, I want to say to you, that they are the most enthusiastic set of men that ever lived and when it comes to describing the merits of their respective herds,

they will not stop at any kind of a statement. Now I am going to tell you a story which illustrates the kind of people they are because I do it better with a story that I can in any other way.

One time, on a cattle train coming into Chicago, there happened to be the representative riding in the caboose of several of the different breeds and as usually is the case, they commenced bragging on their cattle. The Jersey man was the first who told that he owned at one time a three year old Jersey heifer and the first year she freshened she gave 300 pounds of butterfat. The Holstein man next said, that he at one time owned a three year old Holstein heifer, that the first year she freshened she gave 350 pounds of butterfat. The breeder of Guernsey cattle was the next with a story and he told, that he had a three year old Guernsey heifer, that the first year she freshened she gave 400 pounds of butterfat. A breeder of short horn cattle who was sitting in the end of the car got up and said, gentlemen, I have got you all skinned. I have a four year old short horn heifer that gave 500 pounds in a year and she never had a calf in her life nor her mother before her never had a calf. Now it takes just this kind of enthusiasm to make good dairymen and if you can just get full of that kind of enthusiasm here around Clinton, you will surely make a success of the dairy business.

This subject of the dairy cow and her wonderful possibilities, is a subject in itself and the entire afternoon could be devoted to discussion of it and then it would not be anywhere near exhausted.

It has been my privilege for several years to travel through the East, principally in New York and Pennsylvania and if there are those within the hearing of my voice who are familiar with conditions there, they will know, that what I am about to tell them is the truth, and I tell it in support of my statements about the loss of fertility of soil and the conserving of that fertility by the dairy cow. It has been estimated that there are 25,000 abandoned farms in the State of New York. While this is denied by the Secretary of Agriculture of that State and others, they themselves admit, that there may be 10,000 and the probabilities are,

that the first estimate comes nearer the facts in the case. Many sections of Pennsylvania are equally as bad and in fact the same might be truthfully said of the entire New England states. Now why is this? It is for the reason, that they have pursued the same plan of farming as you are pursuing here in this locality. They have raised grain crops year after year and have sold them until they have depleted the fertility of these farms to the extent that they will not return a profit for the labor of working them. These farms at one time were equally as fertile as yours and the value of them was equally as high if not higher than yours are, but today they can be bought anywhere from \$25 to \$50 an acre. Lots of them can be bought for less than the improvements that are on them, and I believe that a young man today, with our present knowledge of restoring lost fertility to the land (for which our agricultural schools are largely to be credited) could do a great deal better to go East for a farm instead of West.

We do not properly appreciate the advantages of our State institutions and especially our agricultural schools. It is through these that we have been made aware of this drain on the fertility of our soils and also the way to restore it when it is once lost. As fine a sentiment as ever was uttered and one that must appeal to the farmer and dairyman of this country, was that uttered by James G. Hill, the empire builder of the West in an address delivered at the celebration of his birthday, when he said, that if he were directing the affairs of this Government, if he was appropriating the money from its treasury, instead of building three or four battleships a year, he would build one and he would use the other ten or fifteen millions of dollars in starting ten thousand agricultural schools. We are waking up to the fact that the farmer must be a man of brains and superior intelligence and that the farming industry requires more intelligence and brains than any other industry in the world in order to conduct it successfully.

I want to talk to you now a short time upon the Silo question and I deem this one of the most important questions that

confronts the dairy farmer today. While we have in a measure discussed the merits of the dairy animal, equally as important as this is the knowledge of how to feed her. I am not going to stand before you and tell you a big story of what the Silo will do but I will say this however, that there is not a building on the farm that will return you the amount of money for the investment as will this building.

Now it is a question that is going to come up to you sooner or later, the question of cheap feed or the question of making your high priced lands produce more to the acre. Do you know, that in the State of Illinois you are wasting feed enough every single year to carry the same amount of stock, that you are caring for now? You are simply wasting this by leaving it out in the field. Field after field that I passed on my trip down here, shows acre after acre of corn stalks left standing there. Do you know that we in the dairy country with Silos value the corn stalks to be worth about as much to us as the grain from it. On this land of yours today that is worth \$150 an acre, you have got to get a bigger return. That is, you have got to get more from the acre in order to maintain this value and if you do not get it, as I said to you before, the value of your lands is too high and must come down.

I am not a large farmer, I only have about two hundred acres of land under cultivation. I have a two hundred ton Silo and I usually fill it off of twenty to twenty-five acres of land and this winter I am taking through forty-three head of cows and ten or fifteen head of young cattle, and ensilage with the exception of the milch cows is all the roughage these cattle will get.

In order to appreciate the value of this feed, you must know that we put it up right at the time when it is in its most nutritious state and with the process of curing it goes through, it is the most palatable feed possible to give to cattle. I also have about fifty hogs, these being shoats and brood sows that are fed nothing but ensilage and the milk from the creamery. There has always been a difference of opinion as to the best way of planting corn for a Silo. No two men will agree on it. As for myself, I plant

just the same as if it was for husking. I cultivate it just the same and when it arrives at the proper stage when the kernels are dented and turning hard and the stalks begin to turn brown at the bottom, I then put it in my Silo. One trouble has been during the past, that we have put it in too green. This will make sour and unsatisfactory ensilage. When I started eight years ago to fill my Silo, there were three of us filled together. I built the first Silo and two neighbors built one the next year. When we started filling the Silo together, everyone wanted to fill first, thinking that they obtained the best feed in this way. We soon just changed round and we all wanted to fill last. We soon found that the nearer corn was matured the sweeter silage we had and the better it agreed with the cattle to whom it was fed.

Now you are going into the dairy business and you want to get as much out of it as you possibly can and I want to say to you candidly, that after having had eight years experience with a Silo and feeding ensilage, if I could not have one, my farm would be for sale. I could not afford to keep it for the reason, I could not make interest on the money I have invested in it. I would dislike to stand before you and advise any one man in your community to build a Silo. In order to get the most out of it and to be at small expense to fill it, two or three farmers should go together. Then the work of filling the Silo is the same kind of a job as threshing is and is no greater.

Now in conclusion, I want to say a few words to you on another point, and that is, in caring for the material, such as milk and cream after you have produced it. We are up against a hard proposition in this country over the quality of our butter. Conditions have arisen that has made it almost impossible to get a first-class product. As a result of this, we are threatened with a substitute coming in and taking the place of our butter. While the four leading markets last year showed a decrease of 8 per cent in our dairy products, there was 28 per cent increase in the oleomargarine product. This is an alarming state of affairs and sooner or later unless we produce a finer article than we are producing today, there is danger that this substitute will step in and

take the place of our butter. It takes no more time and no more money to produce a good article than it does an inferior one, and I wish to urge you, to arrange to furnish a good article of raw material at all times. Dairying is the only industry that is protected by a special law.

Now as a last thought, I want to say to you, the sooner you go into the dairy business, the better it will be for you. You may keep out of it for a time and you may be in a measure successful a while longer with your present mode of farming, but sooner or later you have got to do something to restore to your farms their lost fertility and nothing will do this like the dairy cow. No better object lesson could be given to you farmers than to have you go through the old dairy sections of Illinois, Iowa or Wisconsin. You will find there the improvements worth two or three times as much as they are on the farms that are devoted to grain raising and what the farmers in those sections have done, you can do. If they have built up and restored the fertility to their soils and made money out of the dairy cow, you can do it.

I want to thank you for the privilege that I have had for standing before you for this short time and if as I said in the beginning I have said anything that will set you to thinking or arouse in you a spirit of investigation I have accomplished all that I came for. I have endeavored to tell you the truth as I see it and I have simply narrated the results of my own experience and observation. I thank you.

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DISCUSSION.

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Q.—How do you prepare silage?

A.—I do not know that I could give you a better description than to call it “cow sauerkraut.”

Q.—How do you cut it up?

A.—It is run through a feed cutter and chopped into little pieces about one-fourth inch long, ears, stalks and leaves all together. Some farmers don't want ears. They plant it so thick that the ears will not mature and only have the stalks and leaves. This we think would depend largely on the size of the farm. On the larger farms we would just as leave have the grain ration right with the stalk. Others not having a large farm would want more of the stalk than leaves to the acre than they can get by raising it for the ear.

In regard to the machinery to fill it with, I have my own and they tell a story on me which explains how I happened to have it. I am an old bachelor and they say I never did anything for the community in which I lived until I built my Silo. They say I had a neighbor about a quarter of a mile away and that I used to go down there and borrow all the tools he had. He would kick a little when he came down to get them again but the next time I wanted any I would go down the same as before. I had another neighbor living about a half mile away and that I used to go down there and borrow all his tools until he got sick of coming after them and refused to lend them and that I had another neighbor about a mile away who was just like I was, that never had anything to lend and I bought the machinery for filling a Silo and I made the statement that I would loan it to any man the first year who would build a Silo and while they have nearly worn the machinery out, I believe it was the best offer I ever made.

Some people advocate the building of silos of concrete but a stave silo is all right too and does not cost as much money. I believe it is a mistake to advocate the high priced silos in a new community. Mine is eight years old and I cannot see the least evidence yet of decay.

Q.—Do you weigh it down?

A.—No, sir, I run the chaff over it or cover it with prairie hay. Two years I used a quarter of an acre of sorgum to run over the top of it.

Q.—Do you ever put water on it?

A.—If it gets too dry. Three years ago we were caught with a frost before it was ready to fill. I filled just the same after the leaves were dry and added water and had good silage.

Q.—What method do you use in adding the water?

A.—We run a barrel of water up and used a common sprinkler.

Q.—Are there men in the Silo?

A.—Yes, two of them.

Q.—How do you plant this corn, in drills?

A.—No, sir, I plant just the same as field corn.

Q.—Can you give the amount in pounds for the maintenance of a thousand pound cow a day?

A.—You have asked a scientific question that I do not feel able to answer. I don't keep as close watch of these things as I would like. My tenant tells me, that cows giving milk use from thirty to forty pounds a day.

Q.—Do you advocate building one large Silo or two small ones?

A.—It all depends on the amount of stock you have. You should feed from two to three inches off from the top every day.

Q.—Do you salt it?

A.—No.

Q.—Do you put the water in it for the simple reason of keeping the air out, that is making it lay closer together?

A.—I have never regarded this as the reason. There may be a scientific point in this that I do not understand. One man in the Silo walks only around the outer edge. We pack it there and not anywhere else which excludes the air. After removing the top, I will not have a bushel of spoiled silage in the Silo.

Q.—Is any dry hay fed?

A.—No, sir, when I built my silo I did not manage my hay land right and the first thing I knew I had my barn full and fifty tons on the outside which I had to sell and if there is anything that I dislike to sell off my farm it is hay.

Q.—A member—We have had considerable experience with ensilage corn being frosted and our method is to put water on it. You say you cut your ensilage a quarter of an inch. Our looks like three-quarters of an inch.

A.—Maybe I lied a quarter on an inch. I just looked at it and guessed. That is my idea of it now as I take it from memory, but it is possible it was nearer a half or three quarters of an inch than a quarter of an inch.

Q.—Would you call that a quarter of an inch (showing measurement).

A.—I cannot see.

Q.—If you were going to put in a good machine would you recommend a blower.

A.—I do not know, I never used one. They require more power to run them.

Q. My experience is, you will have to handle the feed over twice where you use a cutter. The ears and kernels fall straight down and are not distributed evenly over the surface. Take the blower and they distribute it all evenly and you can get a quarter more ensilage in the same space with the blower than you can with a cutter but it takes two or three times the power to operate it. You recommend not for one farmer to put one in alone. You said better to have two or three.

A.—Yes sir, I do. The first year I filled alone it cost me over a dollar a ton and last year fifty-four cents. The additional cost was, because I had to hire so much. When three work together we can save money.

Q.—You say you can fill three Silos with only one set of machinery?

A.—Yes, that is right.

Mr. Mason:—I do as he does. I run a small stream of water into the cutter but I cut ensilage a little longer than he speaks of and I put a load through in half of the time. I have a blower and it takes more power to run it but it has a larger capacity.

Q.—Do you think you get a larger amount in a less space with a blower?

A.—You can get it pretty solid.

**ADDRESS.**

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**By**

**Dr. James E. Wright, State Veterinarian.**

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By the President:—We have to change our program a little, and instead of having with us Dean Davenport of the university, we will listen to Mr. Wright, State Veterinarian. It is up to the farmers of this state, the farmers who produce the milk and feed the cattle, to get hold of the question of bovine tuberculosis. I know of no man better qualified to undertake the careful, painstaking, scientific and practical study of the subject than Dr. Wright. He has had all the farm experience and the scientific training necessary, and years of experience in the locality that brought him into direct touch with all the conditions of this disease. I take pleasure in introducing Dr. Wright.

Mr. President, Ladies and Gentlemen:

I feel honored in being selected to fill the place of such a prominent educator as Dean Davenport. I regard him as one of the greatest educators of the age. At first, when I received the invitation, I hesitated and for a time felt as if I would have to decline to accept it, but finally I came to the conclusion that it afforded me an opportunity to bring some of the facts, concerning this very important subject before the people who are directly-interested. Perhaps I take a little different view of the subject than we usually hear in public meetings.

Every form of life must obey certain fundamental laws in order to complete its life history. If those laws are strictly obeyed, let it be in man or the lower animal, life will conclude its allotted span, arrive at its physiological limit and cease to

exist without sorrow or pain. On the other hand, if those laws are disobeyed, the body is weakened, its resisting forces are likewise weakened and therefore we cannot completely resist the attacks of the enemies of life. It all depends upon the manner in which these laws are violated as to what kind of disease will attack the body. It may be a general disease, or it may be one of those special diseases, brought about by certain violations of those immutable laws, or it may be caused by specific disease which is nearly always pathogenic in character.

There is a constant battle raging between the protective forces of the body on one side, and the enemies of life on the other. To illustrate: For instance, start a thousand babies on the road of life, we will say, and many will fall by the roadside before the first mile post is reached, many more between the second and third, and finally when the seventieth is reached there may be only one or two, perhaps none. Why did they not all live to be seventy or more years of age? I will tell you why: They disobeyed one or more of the fundamental laws of nature, and by so doing, weakened their bodies by destroying their protective agencies to such an extent that they could no longer resist the enemies of life.

These common enemies cause a greater destruction of life than all the other forms combined. Then there are the specific enemies of life attacking the protective body which will, when thrown in contact with them, produce disease. However, they will not in all cases; a small percentage of animals will resist them. To illustrate: If you who are assembled here had never been vaccinated, or never had smallpox, and if a smallpox patient should come into this room and shake hands with every person here, many of you would contract the disease and die in a short period of time. Others would linger a longer period before death, others would recover, others would have it in a light form, and there would be a small percentage of you who would escape entirely. This difference in form of the malady is due to the different degrees of the resisting forces which the different individuals possess.

This teaches us that we should try to keep the protective forces of the body at the highest possible degree of physiological efficiency. It is necessary for the lower animal to live and feed according to the laws of nature, and if these are violated any kind of a disease may develop. With just what kind of disease they would become afflicted would depend on the manner in which the principles of life had been violated.

A few years ago, when I was the chief surgeon for the Lincoln Park Zoo, I had an opportunity to observe the peculiar manner in which wild animals would become diseased. For example: In some of the cages we had a few mountain lions which were kept in good warm cages and given all they wished to eat and drink, but they could not exercise very much on account of lack of space. All of this was unnatural and the result was that their young would all die with rickets before they were many months old, notwithstanding that they were given the best treatment known to medical science. I came to the conclusion that if we could hope to be successful in raising these young animals, it would be necessary to return to nature, as near as it would be possible to do so. Therefore, I gave orders that two of the litter of six young lions, about three months of age, should be taken from their mates and placed in a cage separate from the rest. They were not given food until they would grow frantic with hunger, when they were given a freshly killed chicken or rabbit. This method was to be continued until further orders were issued. A little over one year after the time at which separation was made, I insisted that two better specimens could not be found anywhere.

We had monkeys there also, and monkeys, you know, are natives of very warm climates. Knowing this, we attempted to keep them in glass houses, and in the same temperature as the climate from which they came. They were given plenty of good food and water in line with all the knowledge at our command to make and keep the place sterile, yet we never succeeded in keeping one of them alive for a period of eighteen months. A great majority of them died in a much shorter time, and we

were never successful in getting any young monkeys. The cause of death was tuberculosis.

Then we conceived the idea that they should be put out of doors for the purpose of returning closer to nature. Promptly the question was raised as to whether they would stand the rigor of this climate. It was decided that it would not be any worse for them to die in that way than it would be to die with tuberculosis. Therefore, a pole about fifteen feet long was suspended and fastened in position out in the open; a roof was fastened to its top and a wire screen extended from this downward to the ground, making an enclosure about ten feet in diameter. On the sides of this upright pole in the center were placed a few small boxes with holes in them sufficiently large for the monkeys to pass in and out, and which served to protect them in stormy weather. In winter weather for protection, a frame work made of pieces of wood was built at the base of the center pole and about three feet high and this was covered with straw. What was the result? We have monkeys that have been there for six years and they have brought forth young. What does this teach us? It teaches that we must return closer to natural conditions if we desire to be able to protect ourselves against the ravages of disease.

#### **Disease of Civilization.**

Tuberculosis is a disease of civilization and comfort. It is a disease which is brought about by artificial conditions, and it cannot thrive in man or the lower animals or spread when man or animals are constantly out in the open and living as near as possible to nature as they were intended to live. Under such circumstances their protective forces would be so great that if they should become infected with the disease, it would remain at the point of entrance, as a local disease and harmless. Tuberculosis always begins as a local disease, and naturally develops very slowly when compared with other diseases. If man or animal should become infected in this local manner, and if they have lived along the lines that I have indicated it would always



remain a local disease and finally die out entirely. On the other hand, if those fundamental laws have been disobeyed to any great extent, then the disease sooner or later becomes generalized, whereupon it begins to spread. There is food for thought in this.

The greatest amount of tuberculosis is always in the congested districts, such as large cities, and radiating out from them, it diminishes more and more until it fades almost entirely away. We find this to be true, not only in man but the lower animals as well and these conditions are found in every part of the world, though in some places worse than others.

We have the disease in Illinois, and we have more of it than we desire. We should like to get rid of it at once, but that we cannot do, for it would be impossible of accomplishment. Then what must be the plan to solve this problem? Crusades always meet with disaster. Illinois tried one ten years ago. New York, Massachusetts and other states also have tried them, but they were all failures and on account of these results, the disease has been spread not only in the states where the crusades were conducted, but in the adjoining states as well. Wisconsin is attempting to stamp out the disease, but is, in other words, only driving a large percentage of it over the line into Illinois. The Badger State is doing a tremendous amount of testing, and if it should continue to test as many cattle every year as it has in the last year, it would take from seventy to eighty years to test once all of the cattle within its borders. If at the end of eighty years, and if they should have succeeded in testing all of their cattle once, what would have been accomplished? First, the disease would be scattered over a large area, millions of dollars worth of diseased cattle would have crossed over into Illinois, and they would have almost as much disease as they had before they began; differing only in one particular, and that instead of the disease being centered in certain areas, it would be scattered to every point in the state.

The State of Minnesota has been making desperate efforts to eradicate the disease in recent years. The state officials in

charge of this work acknowledge that if they should continue at the same rate at which they are going at present, it would take them one hundred and eleven years to test all of their cattle once. They also acknowledge that if the work should be carried on to completion, they then would not have accomplished much.

If we should attempt to eradicate the disease (tuberculosis) in Illinois, in one year, it would cost the state at least eleven million dollars, and then to keep it out we would have to patrol the borders of the state day and night. We would also have to police the farms and do retesting in order to kill out that which escaped us in our first efforts. Crusades will not eradicate the disease; extensive testing indiscriminately will not do it; both entail a great waste of money and property.

We, all of us, would like to eradicate tuberculosis at once, but by what means are we going to accomplish this all important end? It is evident to my mind that the proper method of procedure has not as yet been brought to light. I believe that we should study the question more carefully, and by doing this we will see at once that the very first step is education. Teach the owners of live stock the true nature of the disease, and the great damage it does, also teach them how to protect themselves from the disease. If this is done, the battle is half won, because then, when you test the cattle, and by so doing, locate the diseased ones and remove them from the herd, the work is completed.

#### **How to Resist Tuberculosis.**

We should teach every one that in order to be able to resist this disease, they must in behalf of their stock, obey the laws of nature. If cows are bred for the purpose of producing milk, butter or cheese, breeding should not be carried to the extreme, for if other attributes are neglected, the result is, that the protective agencies are greatly lowered, which renders them more susceptible to disease. Again, cattle should be out in the open air as much as possible even if they should not give quite so much milk on this account. Barns should be constructed so that each animal should have a certain number of cubic feet of space.

There should be good ventilation and pure water. If possible, construct stables so that the sun's rays will penetrate to every part of the structure as the sun-light is the best of all disinfectants.

When we make a study of our pure bred herds and our dairy herds, we find those fundamental laws of life are almost completely ignored. We find that the dairy cow is made into a machine to produce milk, and as a rule she is kept housed constantly, all of which has a tendency to reduce her resisting forces to the minimum, she is therefore an easy prey for the development of any disease. If she becomes exposed to tuberculosis and contracts it, it will quickly pass from a local to a generalized disease. Cattle that live in the open constantly, seldom have the disease in a generalized form. You will rarely find steers afflicted with it.

I would like to try this experiment, for instance. Take two herds of dairy cows all of the same grade, free them from tuberculosis. Place one tuberculous cow in each herd. Place one herd into the hands of a dairyman who would handle the cattle in the same manner as cows are usually handled in dairy districts. Put the other herd in a pasture where there is plenty to eat and drink; and for shelter, construct an out-building which would be merely a shed. This building should have the south side mostly open, so that the sun could shine on every part of its interior. A complete record of everything should be kept. What do you suppose this would teach us at the end of five years? We accept the fact that the first herd will produce the most milk at first; at least the record will show that part of the first herd has perished with tuberculosis, and that nearly all of the remainder is diseased.

In herd No. 2, a small percentage would have tuberculosis in local form, the remainder would be healthy; none would have been lost with tuberculosis, and it would be practically a sound herd. Now take an inventory of the two herds and compare the records for the five years, and note the results. Which has been the most profitable?

I have been informed by medical men that a tuberculous man, where the disease is generalized will consume as much food as four or five hard-working men. I am informed that such a man must do this in order to keep his weight; if he does not, he breaks down at once and soon dies. If this is true in man, then it must be true in the cow. If it is true, it will probably account for the reason that many dairy cows do not pay for their keep. I should like to have experiments carried on along these lines, because they certainly would be of great value from an economic standpoint.

I am asked to exterminate tuberculosis and to do it quickly. I am asked to do this without law or money. People do not understand what they ask, for before we can accomplish much we must have laws and money. Other states have laws which prevent cattle for breeding purposes and dairy purposes from coming within their borders unless they are free from tuberculosis.

Minneapolis will not receive milk, butter or cheese, unless from cows which have passed the tuberculin test. The owners of such stock must have the test in order to enjoy the markets of such cities and states. They have tried miscellaneous testing and have found that proposition ridiculous. They have learned that if there is not proper disposition made of the reactors, and if their premises are not properly disinfected, the work is absolutely worthless. Again, if the Illinois dairyman should have his cattle tested properly, and the proper disposition made of all diseased ones, and if then he is determined to keep his cattle healthy, can he do it? I say no. He is confronted by the fact that Illinois is the dumping ground for diseased animals, and when he desires to replenish his herd, and goes into the open market, he is very likely to get some of Wisconsin's reactors, or reactors that have been sold by some other farmers. If such reacting cows had been tested recently, they would not again react until three or four months after the first test with tuberculin. It would be useless to buy them subject to the test. Is there any encouragement for such a man to sacrifice his herd or a portion of it, when there is no hope of keeping his stock healthy?

Many of the pure bred cattle owners and many dairymen in Illinois are desirous of getting into communication with me concerning the testing of their herd, but I am compelled to deny them, for the reasons given. Even if I should, the owner would lose all the diseased animals. He would do this principally for the public good, and I do not think such procedure would be proper. If it is for the public good, then the public should pay for it.

#### **Conducting Tuberculin Test.**

Let us say that there is a farmer, a renter, who has 30 good cows, that he has worked twenty years to get that little herd together and perhaps is more or less in debt for them. They have contracted tuberculosis through no fault of his. If he should be forced to have them tested, and to destroy the reactors, it would be a great loss to him. Suppose 20 out of the 30 should react, then it is reasonable, from a scientific standpoint, to say that 15 out of 20 have the disease only in a local form, and that probably it will remain in a local form so long as those animals should live, and that they would be worth just as much to that man for milk, butter and cheese as if they were free from the disease. Then what? Is it just to destroy those animals when of value to him, and not recompense him. The method is wrong. If it is to be of public interest, and if it shall bar that man and his family from making a living, by destroying his cows, I say no. He should receive compensation for them.

Let me call your attention to another matter. If a man has built up a dairy herd of cows, he alone knows that every cow is not a good dairy cow, and consequently he may have to buy eight or nine before he gets a real good one, and those that are not good must be sold again. It takes years to accumulate a good dairy herd. If such a man should get the full appraised value of the good dairy cow, he is a loser, and to an extensive degree too. No one knows this better than a practical dairyman.

If you must have the tuberculin test, how should it be conducted? Who can do it? Can the city do it? No. Can the

owners of cows, with the aid of the local veterinarians or farmers do it themselves? No. Then who shall do it? I say it should be done by competent and trained men of authority, who are perfectly reliable and absolutely under state control. To illustrate: Here are four or five farmers in one neighborhood who have gone to the trouble and expense of testing their cows, and they have sustained losses by destroying the reacting animals. These farmers desire to keep their herds clean; can they do it? No. They are confronted with the same questions to which I have already alluded.

They must have the protection of the state in order to accomplish anything, and such aid and protection should be at the expense of the state. Now, suppose that we should have an appropriation sufficiently large to carry on this work, a dairyman desires to have his cows tested, and the state does the work. If there should be five, ten or fifteen per cent or more of his animals respond to the tuberculin test, what should be done with them? Should they be slaughtered? No, not necessarily. There are one of two things to do: First, if the cows are not of too great value, a board of officers should fix their value, and the owner should receive at least seventy-five per cent of the full appraisalment. As to just how much the owner should receive, I find that there is a difference of opinions. If only a percentage is given, another question arises, as there are about two per cent of all cows reacting which will not show the lesions of tuberculosis on post-mortem examination. You cannot say the disease is there.

To illustrate: If a needle is placed in a large pile of hay, the most careful search may fail to locate it, although it is known to be there. In order to do justice to the farmer, when on post-mortem examination no lesions are found, then such animals should be regarded healthy, and full compensation should be allowed. Second, if the cattle are purebreds, or valuable dairy cows, instead of destroying the reactors, they may be handled under Bang's system, where it is practicable to do so, under state control. This method has proved very satisfactory in all the herds where we have tried it. By following this method in

time, a healthy herd can be built up from a diseased one. This is done by taking the calves from the diseased cows just as soon as they are born and placing them with cows known to be free from tuberculosis.

It is well known that ninety-nine per cent of such calves are free from the disease at birth. The milk from the diseased cows may be used for any purpose if it is well pasteurized. Either of these methods is good, provided the owner wishes to have his cattle tested, and then will either slaughter or separate the affected ones from the herd. When he wishes this done, he will follow your advice, and you will not only succeed in eradicating the disease, but also in keeping it out afterwards.

To illustrate once more: Ten years ago all the state herds were tested for tuberculosis; many of the reacting animals were slaughtered and buried. Nine years after (or one year ago) I tested them again. At Quincy, Ill., where the Old Soldiers' Home is located, I only found one cow diseased, and she only slightly, in a herd of 87; at Joliet, none; at Chester (the penitentiary), one; at the Hospital for the Insane, none. At Jacksonville, there are three hospitals, one for the insane, one a school for the deaf and dumb, and a school and hospital for the blind. In the first there were 84 cows all free, but a bull, purchased a few months before, reacted. At the school for the deaf and dumb there were 77 cows, three reacted. At the school for the blind, there were 20 cows, all free. At some of the other places, where they did not heed the advice that was given them, we found their herds in a deplorable condition. What does this teach us? It teaches that tuberculosis will find its way into a herd of cattle unobserved, and great damage will be wrought before it is discovered—all on account of its insidious invasion, and slow development. On the other hand, it is a disease easy to get rid of when you are once free from it.

I would recommend that the tuberculin test be given to all cattle whose owners are in a proper frame of mind to follow good advice. On the other hand, if the owner is not in such a way of thinking, then it would be useless to conduct tests. It

would be a waste of time and money, for he will seek every opportunity to scorn your advice.

You will readily see from what I have said that if this question is properly handled, the losses would not be so great after all. If your animals are diseased, you can save the young; you can utilize the milk if pasteurized, therefore the principal hardship would be to obey your expert strictly. A few words on pasteurization of milk will perhaps be of value to you. If milk is raised to a temperature of 157 degrees of Fahrenheit, it will give it a cooked taste. If milk is heated gradually until the temperature reaches 186 degrees Fahrenheit, or to 176 degrees for nine minutes, 149 Fahrenheit for 15 minutes, the bacilli of tuberculosis are all destroyed. Cooked milk is just as good for food as raw milk, except for infants.

#### **Questions That Confront You.**

If you were going to have your herd tested, what are the questions that confront you? The first thing of all, you need a man of judgment, experience and authority to make the test. Any one can learn in a short time to read a clinical thermometer, to load a syringe and inject its contents into a cow, and to put down notations on a sheet of paper, but it takes years of study and experience before one becomes an expert and able to tell a true and genuine reaction in every case. For example: An animal may show evidence of the reaction as early as five or six hours after the tuberculin has been injected, or it may be 24 hours or longer before there are any evidences of it. Again, an animal in the last stages of the disease will not react at all. In one instance I found six cows that did not react, but I was able to determine that they were diseased by clinical evidences. When the post-mortem examination was made, every one was found to be so badly diseased that they were all consigned to the tank. What would an inexperienced man have done in such cases?

The bovine species is more susceptible to external influences than any other class of animals. The slightest thing may cause a disturbance between the equilibrium of the dissipation and



production of heat. Therefore the slightest thing may cause the temperature to rise one, two or more degrees, which is often mistaken for a reaction.

The test should never be given in very warm weather. I have seen the temperature of cattle rise as high as 106 or 107 degrees in July and August, when the animals were exposed to the sun, but when the cool of evening came, their temperature would return to normal. If exposed likewise the next day, there would be the same results; therefore, if healthy cattle should be tested, under such circumstances this rising temperature, due to other causes, would be mistaken for a reaction by laymen. Such being true, cattle should not be tested in July or August, unless three or four cool days should come together. There are other disturbances, such as excitement, or a change in handling or the presence of strangers, all of which may cause the temperature to rise one, two or three degrees, which may be mistaken for a reaction.

To conduct a tuberculin test properly, you should have first, a competent, experienced and reliable man to do the work, or at least supervise it.

Second, you should get good tuberculin. The state recognizes only two brands—the United States' and Pasteur's.

Third, the cattle should be handled in a manner similar to that to which they have been accustomed.

Fourth, while the test is in progress, record everything that happens. For example: Any undue excitement due to any cause, if the weather should change from cold to warm, and the time also of watering them should be regulated.

Fifth, the test should consume at least two days. The first day the temperature should be taken and recorded at seven, ten, one and four. Between the hours of 9 and 10 the tuberculin should be injected. On the second day, the temperature should be taken and recorded at seven, ten, one and four. If there has been no reaction in the herd up to this hour, then your work is complete, but if there should be any reaction, you should continue until at least two more temperatures are taken.

It would be the proper thing to take one or two temperatures the third day in order to catch those which would not respond to the tuberculin test until a later hour. Also if there have been many reactions, you should make a physical examination of the herd for the purpose of detecting those that may be so badly diseased that they would not react even if any should be present.

Separate the diseased animals from those found healthy. Remove all loose material from their former abode and burn it, then thoroughly disinfect the premises. The diseased animals should be slaughtered or handled according to the teaching of Bang.

You should purchase all stock subject to the tuberculin test to protect you from the abuses which are in vogue. We should have a law which would prohibit the shipping of trailing cattle into the State of Illinois for breeding purposes, which have not successfully passed the tuberculin test. Such a law would prevent Illinois from being the dumping ground of diseased animals from other states.

The State Board of Live Stock Commissioners should have control of the sale and use of tuberculin for the purpose of correcting the abuse of its diagnostic value.

We should have an indemnity fund sufficiently large so that the owner could get at least a fair percentage for slaughtered animals, and also a general fund whereby the state could be employed to do the work with trained experts, free of cost to the owner.

#### DISCUSSION.

Mr. Gilkerson:—Can there be any legislation to prevent a dealer from knowingly buying tubercular cattle from one farmer, removing them into another neighborhood and selling them to another farmer as healthy cattle?

Dr. Wright:—Our present law provides that it is a misdemeanor for any one to sell, or offer for sale, any animal suffer-

ing from a contagious disease. If any one has knowledge of, or has good reasons to believe that a contagious disease exists in his or in his neighbor's stock, he should report the same at once to the State Board of Live Stock Commissioners. Failing to do so, he is liable to a fine.

Mr. Gilkerson:—The case I refer to was of a cow with tuberculosis. I sold her and her calf with the understanding that they should be shipped to Chicago for immediate slaughter. I sold them for \$15. The next day she was sold to another farmer for dairy purposes for \$42.50.

Dr. Wright:—Our present law applies to this case.

Question by a member:—Would not the owner of the cattle be just as liable, if he knew they were diseased, as the seller?

Dr. Wright:—Yes.

Mr. Newman:—It seems to me that Dr. Wright has gone into the subject very fully, and we should try some way to bring this within the reach of every dairyman in the State of Illinois. Bulletins are very good, but they do not reach the whole people like the newspapers. I believe I would like to make a motion that our Secretary be instructed to have Dr. Wright's address printed immediately in pamphlet form and send a copy of it to every country newspaper in the state of Illinois. If the Associated Press would print it, then the country newspapers would get it. I make this as a motion, if it is in order.

The President:—It is in order.

Motion seconded by Mr. Mason. Carried.

Mr. Janes:—Would it be possible to control the manufacture of tuberculin in a wholesale house?

Dr. Wright:—Yes, if we had such an Act, and a penalty for any violation of its provisions, then it would be an easy task. I believe that it would be one of the greatest motions of all for your protection.

A Member:—Did you say that cows should not be kept in barns even if they were well ventilated and lighted.

Dr. Wright:—If cows must be kept in barns, I say that the barns should be so constructed as to be very well lighted, with plenty of good pure air, sufficient air space for each animal and good drainage. I point you to the beef barn at Urbana, which I consider a model from every standpoint.

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**CHECKS ON CREAM RECORDS.**

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**By**

**N. V. Hepburn, Assistant in Dairy Manufacturing  
University of Illinois.**

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Until comparatively recent years the discussion of a subject would have been entirely useless, not only because of lack of information and apparatus for carrying out lines of work that might be suggested, but also because we had not come to the point in our creamery work where the operator really wanted to put it on a business-like basis. The old systems of paying for the dairy product gave wide margins and offered a generous living with comparatively little effort. However, just as the higher prices for farm products have forced the dairy farmer to change methods, secure more efficient cows and keep records of production to compete with his friends doing other lines of farming; so similar competition has not only forced creamery operators to adopt some uniform method of paying for the dairy product, but also to work on a much narrower margin which has in these later years served to magnify and emphasize the importance of details in our creamery work.

In view of the fact that so many methods have been suggested and so many forms put into operation for keeping creamery records, we would feel out of place in trying to add to that phase of the subject. However, we are obliged to acknowledge the presence of a large number of forms in use which are bound to be recognized, according to their own merits on the grounds of completeness, simplicity, and personal preference of the user himself. However these facts may be, it is of more significance to know that in our creamery business there is a certain amount

of data within the reach of everyone familiar with creamery operations which represents the dividing line between failure and success. We recognize the business principles of the banker who foots up his financial standing at the end of each day, as being perfectly sane. We would not countenance for a moment the transaction of an elevator company whose management did not know at the end of each day the transactions which had taken place and the amount of money involved. It is only sensible to assume that if we do not adopt these same sane methods of doing business in our creamery industry we are bound to run the thing into financial ruin, rob the honest farmer, in some instances misplace funds, at best we are in a condition of doubt and uncertainty with but little control over the situation, and the "Closed" sign will sooner or later be over our doors, either because of financial disaster, or because the raw product is going where a fair deal is met. Statements of this sort need not necessarily be considered prophetic, since they recite in a few words the history of many plants in our own state.

To begin with, much of our trouble and misunderstanding has arisen through the improper and misappropriated use of the terms "moisture" and "overrun,"—two features of our work which I do not care to discuss in this connection further than to say that they are factors incident to creamery operation, rather than subjects of manipulation, such as they have often been made. Overrun and moisture will take care of themselves, provided the previous work has been carried on accurately.

Now we have come to the point where we are willing to say that at the end of each month, each week, each day, or any period we may wish to designate, that we should be able to account in some way for every pound of butter fat that has passed through our weigh tank. If we cannot, we are liable to the same disaster that awaits any business without a system of accounting.

There are only three possible ways of accounting for butter fat that has become the property of a creamery. It has been made into butter, a portion has become a loss to the plant under the head of mechanical loss, which includes loss in handling,

loss in separation, loss in buttermilk, loss in shrinkage, or an error in testing has caused us to pay for more butter fat than is actually received, and this last point, namely, error in testing, arising from the misuse of the Babcock test, is a subject which has already been talked threadbare, but suggestions favorably met with have too often been entirely forgotten.

With no desire to cast reproach on the creameryman or the methods he employs, facts go to show that more general dissatisfaction involving losses on either side, can be attributed to the misuse of the Babcock test than to any other one factor involved. One obvious reason for this is that testing does not occupy the prominent place in creamery work that it should.

The very simplicity of the test seems to have made fat determinations a stumbling block to the creameryman and it is divulging no trade secret to say that this whole operation, important as it is, is in too many instances occupying a "back seat." If fat, as indicated by the Babcock test, is the basis upon which we are going to establish our creamery pay roll, why not let testing occupy a legitimate portion of the day's work, and not be a task to be done after the "day's work" is over?

Suppose even that we think we are carrying on our testing in the best possible manner and so far as we can tell are doing our best to have this part of the work done well; how many of us can take a twenty-four bottle tester and obtain twenty-four perfectly clear and uniform tests? Not a sure sign of accuracy, to be sure, but an indication of good workmanship. Then how many of us can take a dozen samples from the same source and obtain results close enough to be within the limits of experimental error, and what latitude of variation should we allow for such error? These are all fair questions, and worthy of our honest answer.

It is a well known fact among you who are familiar with cream and milk testing that from the very nature of the apparatus we use it is impossible to obtain results which are exact duplicates. This is true, first, because of lack of sensitiveness in cream scales; second, because the best bottles on the market are not graduated closer than a half per cent; then, finally, we are

obliged to allow a fraction of a per cent for the individuality of the reader himself. All of these factors conspire to make us liable to certain reasonable error which is always present and must be reckoned with. However, these errors should not always fall in the same direction nor need they change results materially, since they tend to divide themselves about equally on either side of a medium line, thus tending to equalize each other at the end of any given testing period.

To further illustrate, a table has been prepared, showing the tendency for variation of two experienced testers, determining fat in the same cream. The samples tested represent the composite tests of patrons' cream for the two halves of the months named. Reading the columns in either direction, shows seldom a variation of more than half of one per cent, and that there is no regular variation in either direction. From our own creamery records we might tabulate data from ten months, on one hundred patrons, illustrating the same point. Evidence enough to convince us that in testing cream samples the reading is likely to be one-half per cent too high, or one-half per cent too low.

Errors greater than this may usually be accounted for in one of the following ways: burned tests, poor scales, careless weighing, incorrect sampling, and misreading. Burned or cloudy tests should be the least of our troubles, since they are easily overcome by employing proper temperatures of acid and milk and regulating the strength of acid. As an aid in securing more uniform readings and less discolored fat columns, we have found it very beneficial to change the order of manipulation for cream and add water to the neck previous to the first whirling before the acid has had a chance to char the fat. Then handle in the usual manner, whirling twice for periods of 3 and 5 minutes, respectively. This method, intelligently followed, seldom gives occasion for cloudy tests.

It is not an uncommon thing to find in many places where cream is weighed for testing, scales that are not sensitive enough to be used for that purpose, or dirt and dust has accumulated in the bearings, causing them to stick. Scales in this condition are



likely to cause more error than the use of the pipette, a method incorrect enough to make its use punishable by law.

It is not uncommon to still find an error introduced by an improper reading of the fat column, for instance, the older directions for reading cream state that we should read over all, that is, between points indicated by upper and lower meniscus. Later directions for reading cream state that we should read to the bottom of the upper meniscus at a temperature of 140 degrees F. This amounts to much the same as the method employed by our own experiment station, but, since in practical work we seldom find a tester who reads samples at 140 degrees, we have compromised by dividing the meniscus nearly in half and read at a temperature of 120 degrees F., according to the accompanying chart. So far we have no authority in the way of a direct comparison with the chemical analysis which would permit us to use this form of reading, but comparisons of butter fat churned with butter fat recovered on a large number of churnings correspond so closely that we feel warranted in using this method until it is sustained or disproved by the chemist. Another common mistake in reading is that of disregarding the half per cents. When we consider that a per cent on 30 per cent cream will change our overrun practically 2 per cent, we can readily understand why in some cases we get such high or such low overruns. To obtain anywhere near accurate results, the half must be taken into account.

Errors due to improper sampling of cream are not particularly common where the samples can be taken by the creameryman himself, but we must have a great deal of sympathy for that plant that must depend upon the accuracy of the cream haulers' samples. Lack of knowledge of the importance of sampling, combined with favoritism on the part of the hauler, often work havoc with creamery records, and the only safe method, where such samples are taken, is to run a daily composite check on the hauler. Such a check need be no reflection on the hauler, and often leads one directly to the source of creamery loss.

The accompanying table shows what may happen when incorrect samples are taken.

In approaching the subject of "checking up" creamery records, let us understand that we do not intend to advocate or outline any particular form of testing or attempt to make any fixed standard which would be suitable to all conditions. That is, I do not mean to say that daily samples or that composite samples should be used in all cases as a basis for payment. This is a question that every man must settle for himself with the information he has at hand. In this connection, I merely desire to show that by adopting certain methods the creameryman has the situation within his own grasp and is able to find out for himself exactly how he stands for any given period of time.

In beginning any checking operation we must first have an accurate weight of the cream as it is delivered. Then it is possible, if not desirable, to find the amount of butter fat delivered by each patron and the sum of these deliveries will represent the amount of butter fat delivered for that day. If the cream is put into one or two ripening vats, a composite sample from the cream weighed into the churn will be our first check on the accuracy of the individual tests. That is, the sum of the fat from the individual tests should equal the butter fat in the vat, minus whatever losses there may have been in transfer and skimming, provided part of the product has been taken in in the form of whole milk. This check, it is true, is often not only inconvenient, but even almost impossible to obtain, since it involves the transferring of large amounts of cream in comparatively small vessels, yet we find such a check not only desirable, but most essential where we wish to find where certain losses really occur.

It has been the usual custom to drop the checking at this point, but if our cream is made into butter why not carry the comparison one step further and compare butter fat paid for with butter fat recovered in the butter? This will give us the total loss in handling and the intermediate checks will serve to tell where these losses occur. That is, butter fat in the ripening vat is equal to butter fat in the butter, minus losses in churning, and butter fat paid for should equal butter fat in butter, minus total mechanical loss, plus a legal error in testing. Since these

two factors are inseparable, it would be inconsistent to charge the whole difference to mechanical loss.

In making comparisons like the above, it is perfectly obvious that certain natural difficulties are bound to present themselves which tend to prevent us from obtaining absolute checks. As an example for determining the per cent of fat in butter, it is almost impossible to say just when we have a correct analysis of our butter, due to the fact that butter in the churn is not a homogenous mass, and portions taken promiscuously here and there may or may not represent an accurate sample of the butter. Then, too, we find that testing of butter fat requires some skill and care, but if the samples are carefully mixed and weighed, very satisfactory results may be obtained. While the presence of these outside factors, causing apparent differences in results, is a source of annoyance to the investigator, they are by no means disastrous to our practical results, but they do serve often to explain apparent error or lack of uniformity in results.

We also find by comparing the Babcock tests with a number of the chemical determinations for fat in butter that we are able to obtain results which warrant us in using this test in a practical way for determining fat in butter, so it is possible to make the Babcock test our servant to the extent of a complete check from the time the butter fat enters the creamery in the form of milk or cream, until it is sold as marketable butter.

The accompanying chart seems to illustrate in the best possible way all conditions and gradations where we are making comparisons and seeking for losses when butter fat in the same cream is determined by several testers. The period represented covers fifteen days, or the first half of the month of December. The checks employed are daily testing on individual patrons' cream, made by our regular tester, as compared with similar tests made by the short course buttermakers, a class of eight creamerymen, coming from Northern, Central and Southern Illinois. In addition to using regular checks, composite samples were prepared by each set of testers, so we have not only a comparison of daily checks, but also a comparison of daily and

TABLE I.

Table showing possible checks on butter fat in the same cream. Representing fifteen days' work and two sets of testers.

DATE	BUTTER	PER CT. FAT	LBS. FAT RECOVERED	LB. FAT BY VAT SAMPLE	LB. FAT BY UI. IND. SAMPLE	LB. FAT BY SC. IND. SAMPLE	OVERRUN BY			POSSIBLE O. R. $2\frac{1}{2}\%$ FOR LOSS
							I.	II.	III.	
Dec. 1...	391	79.91	312.44	326.0	317.35	328.3	20.0	23.1	19.1	22.7
Dec. 2...	344	82.69	284.45	275.4	273.56	281.3	24.8	25.6	22.2	19.1
Dec. 3-4.	596	82.62	492.41	490.0	499.74	498.9	21.7	19.2	19.5	19.2
Dec. 5-7.	361	82.42	297.53	296.4	301.05	296.4	21.7	21.8	19.9	19.5
Dec. 8...	225	82.10	184.72	196.0	201.60	193.6	25.0	11.6	16.2	19.9
Dec. 9-10	383	82.95	317.69	315.0	335.00	348.8	21.5	11.3	10.0	18.7
Dec. 11..	360	81.71	294.15	297.0	304.00	291.8	21.2	18.2	23.3	20.5
Dec 12-14	360	82.13	295.66	300.4	317.00	310.0	19.8	13.6	16.1	19.9
Dec. 15..	306	81.20	248.48	270.0	269.00	255.0	13.3	13.8	20.0	21.2
Total....	3326		2727.53	2766.20	2818.3	2804.0	20.2	18.	18.6	20.0
Daily av.	369.3	82.00	303.06	307.3	313.1	311.3	20.2	18.1	18.7	20.0

TABLE II.

	Butter	Per cent fat	FAT BY				
			Vat Test	U. I. Ind. Test	S. C. Ind. Test	S. S. Comp.	U. I. Comp.
TOTAL FOR 15 DAYS..	3401	82	2829	2881	2867	2863	2899
OVERRUN...		19.5	20 2	18.06	18.6	18.7	17.3
Loss and error in testing, based on vat samples. . . .				1.8%	1.32	1.32	2.4

Table comparing every day with composite testing; also mechanical loss and error in testing, using vat sample as a standard.

composite sampling for these fifteen days. Not enough data to prove any point, to be sure, but it shows the trend that such comparisons are likely to take.

It is true when we come to study the table in detail that there are many points of variance, as well as some exact checks, to be obtained, and it would no doubt have been possible from our own creamery records to have prepared records which would check much more closely, but since this represents work, a part of which was done by practical creamerymen, for this purpose, we consider it more valuable and more fairly representative of actual conditions. It will be seen that a number of points of variance are the result of mistakes in recording weights or tests, but this is the exact data from the milk sheet, and no effort has been made to correct them.

The first column of the chart gives the amount of butter made at each churning; the second the per cent of fat in the butter, according to the chemist's analysis; the third column represents fat recovered in butter, according to chemical composition; fourth represents total butter fat taken in, according to composite test from ripening vat just previous to churning; column five is the butter fat taken in for each churning, accord-

ing to the sum of the individual testing made by the University tester; column six is the result of similar work done by the S. C. buttermaking class. The remaining columns indicate the overrun for each respective condition, the last column being the overrun it would be possible to obtain with butter of the various per cents of fat, provided there was a  $1\frac{1}{2}$  per cent mechanical loss. This would be slightly too small a loss for some conditions, but represents the loss obtained in our own creamery.

#### Discussion of Chart I.

#### Discussion of Chart II.

Facts presented in the above form mean little in themselves only as they are indicative of what is happening in our own and in other states, every day a plant is in operation. Conclusions or lessons we might draw from such data are that it is possible to account for all butter fat that is delivered to a creamery, whether in the form of cream or whole milk; that owing to our imperfect methods which we are obliged to employ in the practical field, there is bound to be some lack of uniformity in any set of figures based on practical work; that every day discrepancies do occur, which are clearly the result of carelessness on the part of the operator; that the adoption of some such system is not only of value to the inspector but to the operator, since by its use he becomes his own inspector; that it is out of the question for an operator, acting upon the advice of those who are supposed to know, to change from a low to a high overrun without reducing his mechanical loss, modifying his system of testing or changing the composition of his butter; that since it is mathematically impossible to combine high fat content with high overrun, the Babcock test for butter fat in butter becomes a guide and a check to the creameryman, the farmer and the inspector as to the highest possible overrun, as well as to the amount of butter fat recovered in any day's run.

## DISCUSSION.

Mr. Campbell:—Q.—Will it make any difference on per cent of test, whether, after you run your samples out, you warm your samples up thoroughly, or read just as they come from the tester?

A.—It is assumed you read the samples as they come from the tester 120 to 140 degrees. If they have been standing around for a short time and you want to warm them up, you can get an accurate reading, yet I would not suggest—

Q.—A sample of cold milk and run that through the tester, would that be sufficient to warm that enough?

A.—You speak of the hand tester? Often in a cold room and running a hand tester, it is desirable to put hot water in in order to maintain the temperature. Then it is desirable to put hot water in the base of the tester to keep up the temperature.

Q.—If too warm you cannot get a good reading that way?

A.—Yes sir.

I thank you.

By Mr. Caven:—I just want to say that there is going to be a banquet tonight at Armory Hall, and because banquets cannot be given for nothing, a charge of 75 cents a plate will be made which is very reasonable. I assure you the program will be an excellent one. We will have some local speakers besides some of the visitors. There will be music by the best orchestra in Clinton. Mr. Lumbard will sing and we shall have a very pleasant and profitable evening. The tickets can be bought here or at the drug store.

These books here are the only report the association gets out every year. This is largely the report of the proceedings of the convention last year at Marengo. We would be very well pleased if each one of you would take one of these books and look it over. You are welcome to take it home and read it and hand it to your neighbor, or do what you please with it. We have quite a number of these reports, and you will find some valuable matter in them.

A photographer came here a little while ago and wanted to take a picture this afternoon, when he can get the largest number here. No one is obliged to buy them.

This afternoon's session will commence at 1:30, or as near that as we can. I wish some of you who are well acquainted locally would get as many of the farmers here as possible this afternoon. The subjects will be interesting, and I am sure that it will be of especial interest to listen to Mr. Shilling, who runs a big dairy farm in Iowa. He will talk on silos and ensilage.

Adjourned until 1:30 p. m.

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## SUGGESTIONS FOR ILLINOIS CREAMERIES.

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By

F. A. Jorgensen, University of Illinois.

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I fully realize that the greater part of this audience is not buttermakers and therefore not directly interested in this subject. I hope the few buttermakers who are here will be somewhat benefited by what I have to say, though I fully realize the absent ones are those who ought to hear it. I don't want you to go away thinking I am knocking on the Illinois Buttermakers; on the contrary I am speaking with the intention of doing some good toward improving conditions under which they work. I feel I have a right to speak from this standpoint as I have not only had a chance to observe conditions as they exist, but also where many of the creameries and buttermakers could improve and ought to improve. Some of the things I am going to mention may not hold true about all the creameries, but I am sorry to say that it holds true of only too many.

In the last few years there has been a marked change going on among the Illinois creameries. We used to have nearly all whole milk creameries; today we have but a few. The steady growing demand for milk to supply Chicago and other large cities has changed our best and highest producing dairy sections, formerly dotted with whole milk creameries, into the shipping business, condenser and bottling plants. They have sprung up all through these high producing sections and especially in the northern section of the State and in the so-called Elgin district. These industries proved too strong a competition for the creameries and they had to vacate. But in sections where creameries still remain there has been a steady change from the whole

milk plant into the cream-gathering system and I am sorry to say in many places not for the betterment of the products manufactured. The change came in many places very suddenly. In some districts the change was brought about in less than two years. This created considerable confusion among the creameries. It took many of the buttermakers by surprise; they did not thoroughly understand this cream-gathering system and many were not capable of coping with the situation so suddenly thrust upon them. The results were that many, formerly successful plants under the wholemilk system, went to the wall and others received a setback which took them years to overcome. The blame for all this trouble is invariably, by creamerymen, put upon the so often cursed little hand separator. Yet, the separator can hardly be blamed. The bad condition of the roads in many places during certain seasons of the year made it almost impossible for the dairyman to get through and one cannot blame them for wanting to make the load as light as possible. I am of the same opinion as a creameryman I was discussing the subject with sometime ago when he said, "The trouble so many of us had when we were obliged to change to the hand separator system cannot be blamed onto the separator, but it was because we did not thoroughly understand our business; we were not capable of handling the situation so suddenly put before us and take advantage of the new opportunity offered for bettering ourselves."

We may properly say that the introduction of the hand separator marked a new era in the creamery industry. Since it has come into general use creamerymen have been obliged to adopt somewhat different methods, both in relation to the business system and the general method of handling the product.

It has developed some competition between creameries. It has made possible a creamery in sections where a creamery was almost an impossibility before, as they can cover and draw from a larger territory. But it has left one bad effect, for it is generally claimed by older creamerymen and the butter dealers that it has lowered the standard of American butter. That is one thing

that works against the creamery industry and must be overcome even if we have to change back to handling wholemilk. The creameryman's two troublesome problems of overrun and the quality of the butter have been intensified.

I do not intend to discuss the question of overrun farther than to say that the general causes for low overrun are improper weighing, poor cream scales, taking incorrect samples and too hot testers. I have found by experience that this is a thing you can't tell very many people about, that is, so they can get results. They have got to be shown and educated and the best place to show them is at their place of business. But, whether the overrun is high or low; quality is the thing we must aim to improve.

We all know the fundamental principle of making good butter, is to get good raw material. But, as I look at it, before many of our creamerymen request their patrons to deliver better milk and cream, it becomes their duty to have their creamery in a good, clean, sanitary condition. The majority of the creameries I have visited are in what can be called a sanitary condition. But most of them could be greatly improved, especially as far as neatness and appearance is concerned, if the paint or whitewash brush was more freely applied. I am a great believer in whitewash on account of its purifying effect and because it has a tendency to quench and eradicate the unavoidable factory odor. But never whitewash the ceiling as it scales off and pieces are liable to fall in vats and in the butter. Paint the ceiling and whitewash the wall. One cause of a strong odor in many creameries is the drain. Every one knows that if the sink in the kitchen is not connected up with a trap, you cannot avoid a bad smell from the drain, and the same holds true about the creamery drain. Yet, I find it is a thing that is overlooked in many creameries and consequently it leaves a strong odor, which is especially bad when the wind has a chance to blow in from the outlet. We must try to eradicate the odor as much as possible. One creameryman said, "What's the use to keep the creamery clean when we don't get good stuff." To him I could justly say that it was his duty and that I knew of no greater stimulus toward getting the

patrons to bring good milk and cream than a clean, sweet-smelling and neat appearing creamery.

We may divide the creameries into two classes and see what can be done in order to improve the quality in both. We have the wholemilk creameries where, on an average, the best butter is made, yet without a doubt if more of them would pay strict attention to the skimmilk pipes and tanks, a great deal better milk would be received. The reason is plain for if the farmer is obliged to take back, in the same cans in which he makes his deliveries, skimmilk that is, to say the least, stinking and sour enough to take the tinning off the best cans in a short time, no one can expect him to bring sweet milk with a good odor. Besides it leaves the cans in a rusty condition in a short time which is one of the worst things for the milk and cream and the cause of the so much complained of metallic and fishy butter, which today is a loss to both creamery and patron. The commission men don't want it and the renovating factories will hardly take it. Every creameryman should consider it his duty to keep the skimmilk tank and pipes clean and it has been my observation where they do that they receive a much better grade of milk.

Our cream gathering plants is where the greater portion of the poorest butter is made and it is where we need to make the most improvements. Theoretically, it seems very easy, for, why not refuse the poor cream? But in many places this is an impossibility if they intend to keep on doing business. Competition is strong, and if one fellow refuses another one is always ready to accept. Yet, it has been my observation that considerable improvement can be made if the creamerymen will make an earnest effort. When the patron delivers the cream himself directly to the factory and comes in immediate contact with them they have less trouble than where they send out wagons. If the patron delivering his own cream brings it in bad shape the buttermaker has a chance to talk to him and call his attention to it, but when he has to depend upon haulers he is up against it. Haulers are generally of the type that do not make much of an effort and do not know how to get the patrons to keep the cream

in good condition. It has been my observation in my work along that line, that considerable improvement can be made on these cream routes if someone occasionally goes over the routes with the hauler and locates those that generally send the poor cream.

Meet these men with an intelligent argument and ask them to do better, and invariably I have found some improvement. Suggest to them what you think could possibly cause the poor cream and *how* it may be remedied. The cause of the poor cream is generally due to dirty separators located in improper places. Show these patrons that the separators can be kept clean and how to do it. Suggest to them how to fix a place at small cost where the cream can be kept properly. I have found that a good many are willing to do it, when they know how. At least this has been my observation in going over the routes two or three years in *succession*, and in places where the buttermakers have made an earnest effort to improve considerable has been done. Another advantage in going over the cream routes with the hauler is that it gives the creameryman a *chance* to check up the hauler and I have found in many places that it is much needed in order to give the patron fair treatment.

If we succeed in getting a good article to the creamery then it is up to the buttermaker to make good butter from it. He must avoid all the mechanical faults found in undergrade butter. Some of the most common faults, I think you will find are grittiness, mottles, waviness and occasionally slushy butter, but I feel like saying that anyone who can not avoid *slushy* butter has no business in the creamery. The other three mentioned faults are generally caused or at least are nearly always found in connection *with* undissolved salt. The reason we have so much mottled *butter* is because the buttermaker does not know what causes it. However, I am pretty sure he would find the cause if he kept record of his churnings, that he as a rule would have the complaints about mottles when the salt was not properly dissolved.

Q.—Won't uneven temperature cause it? .

A.—That will cause wavy butter.

Q.—Suppose your butter is worked very cold?

A.—Then I would suggest either heating the salt or wetting it so that it would dissolve easier.

To illustrate the point. Two tubs out of the same churning made at the University purposely for this convention, was left very gritty. One was placed in a warm place so the salt had a chance to dissolve in a *few* days, and after it was dissolved and the butter cooled, it turned out very mottled. The other tub was placed at once in a cold place so the salt would not dissolve so readily. It is not dissolved yet and the butter is mottled, but a very little, hardly visible and a third tub, in which the salt was properly dissolved before it left the churn shows no mottles whatever. If the salt is kept in a moist condition and *not* too cold and the butter isn't worked at too low temperature undissolved salt is readily overcome.

#### Using a Good Starter.

Without a doubt, a good deal of the butter could be improved if more of the creameries used a good starter. I fully realize that in many places it will be hard to keep a good starter when it is needed the most. In order to get the best results it will be necessary to have a starter can. I find the majority of Illinois creameries have a starter can but more need to put them into use. It is true that some of those attempting to make a starter do not always meet with good results, but it is generally because, first: they don't know what a good starter is and don't know how to care for it properly; secondly, because they are not careful enough in selecting the right kind of milk to make a good starter and third, some are not fixed to keep the starter properly under control. When the creamery receives milk every day they ought not to have much trouble in keeping a good *starter*, but when they get milk but two or three times a week is when the buttermaker is up against it. My suggestions for the

man in the latter case would be to first, fix a place where the mother starter can be kept under control; second, to take several milk bottles or fruit jars, one for each day, between the days you run; fill them with milk on the day you run; sterilize them properly and propagate one every day and the starter for the cream the day before you run or it might be possible to *propagate* both the day you run and as soon as beginning to thicken cool down and hold them at a low temperature enough so that they do not get overripe.

Q.—When cool it down?

A.—As soon as beginning to get thick.

Q.—What temperature would you hold at?

A.—As low as you can.

Q.—48 to 50 degrees?

A.—That's the highest I would hold at.

Q.—My experience is this. When the starter is just ready to turn and I put it down into my spring it will not coagulate until next *morning*. If left out of doors it coagulates. My spring is 47.

A.—Don't cool down until thick.

Q.—I have *found* out by experience that the acidity will not *develop* very much then.

A.—It will develop some.

Q.—I have found out by putting into the *spring* an hour before coagulating, it will not coagulate until next morning.

A.—But, if it is cooled as it thickens, and held several days it will get plenty ripe. I have had good *results* from doing it that way.

Q.—In creameries you haven't always got the milk?

A.—Yes sir, that's why I want several jars full sterilized so you can propagate one every day and the regular starter the day before you want it.

Under all conditions in order to get the best results you must know how to make a good starter, use good milk and a good culture, and in order to get any material effect, use from 15 to 20 per cent and better 25 to 35 per cent, especially on gathered cream.

### Better Equipped Creameries.

We all realize if we had better equipped creameries, the task of the average buttermaker could be greatly lightened. One may ask, "Why do we have so many poorly constructed creameries? First, because *so* many of them were built 20 to 30 years ago, with the intention of making both butter and cheese and for doing things in an entirely different way than they are being done today; and they did not seem to know what a creamery ought to be like in those days. Many old buildings in the course of time have been changed into a creamery and the results are that many of our creameries are in a condition so they are not *easily* kept clean and sanitary. Another reason is, so many creameries, and especially the farmer's creameries or stock companies in the southern and western portions of the state have been started by promoting *firms*. Then creameries were mostly promoted among people that were ignorant on the subject; they did not know what they wanted nor what they ought to have in shape of a creamery. The promoting firms organized these so-called combined butter and cheese *factories*; made the parties believe they were getting two in one, when they in reality were not getting much of anything, and the possibilities were that in 99 per cent of the factories built by these firms, no cheese would ever be made. And if they should have started in to make cheese they would have had but an excuse of a *cheesemaking*



outfit and so to speak, no curing room at all. Generally the creamery part is left in a badly cut up and poorly arranged condition, and even in those built in the last two years invariably a cheap wood floor is put in, when it ought to have been concrete, and a poor drain from the creamery. They are generally poorly organized, the promoting firms furnish them with a cheap man, in many places there is not milk enough in the territory at the time they are organized to cover the bottom of the vat, and the results are that many of them are doomed before they ever get started. Consequently creameries can be found in different parts of the state that never turned a wheel.

Before I close I want to suggest a few things that I *have* thought of and observed. A good many Illinois creameries need entirely different men. But let us start at the weigh stand and see what a good many little things I know some men are not doing but ought to do.

The milk and cream should be correctly weighed and not estimated. A sample should be taken of each delivery, whether deliveries are made once a week or every day. The sample *jars* should be properly and plainly marked to eliminate mistakes on the part of weigher. These things are overlooked in too many places, but the patrons have a right to demand them. When they go to testing, I find a good many are in the habit of not marking the test bottles and the result is that most of them, by the *time* they get through don't know where they are. There is a place on the bottle to mark and I hold it is the tester's duty to do so. The test bottles ought to be calibrated before taken into use; though most of them are sold under guaranty to be correct, yet I have found cream bottles off as much as 10 per cent, and milk bottles up to 1½ per cent. That should be enough to convince creamerymen that they ought to go through all new bottles with the calibrating nail, to be sure they are correct. The skimmilk and buttermilk should be tested oftener than it is; *and* lastly, keep more complete records. In most creameries they have a secretary and manager, but I can assure you in many places it is by name only and not by virtue.

### Keeping Creamery Records.

In creameries where they are obliged to have such a man, it is up to the *buttermaker* to adopt some system of keeping records whereby he may know how things stand. Every buttermaker ought to foot up his weigh sheets every day, figure his yield. In cream gathering plants where testing is done every day he ought to figure the overrun daily. He should keep a record of the amount of *butter* made, sold and shipped every day, so there would be no losses and not wait to the end of the month and figure the month's make by amount sold. If a churning record was kept no doubt it would be of great help to many.

Many say that there is no time to do all these things. Can we afford not to do them? If we are going to make a success at the creamery business and not run it into financial ruin, or lose patrons because we are not doing our duty, we must keep records, watch and pay attention to the little things. It is not so much that "there is no time," as to brace up and take the necessary steps to *do* it. Let's try this coming season to do better. Let us push together and work together to make it a success and as true dairymen let us never lose sight of quality, for with it we shall undermine and subdue the enemy, oleomargarine. With quality we can do it.

Mr. Rockwell:—I want to know whether a creameryman can take or get a correct reading of cream that has been kept a month in warm weather?

A.—If the cream is in a condition so he can get it thoroughly mixed, he can get a correct test even if it is a month old. If in a chunky condition, so he cannot get it thoroughly mixed it is almost impossible to get a *fair* sample.

Q.—Which way; too high or too low?

A.—It is liable to be either way, no matter how he catches the sample. But the chances are it will be against the *patron*.

Q.—What variance between the cream test and milk test? Where a *patron* tests his milk from each individual cow separately, weighing and sampling each milking, what difference ought there to be if any between the *amount* of butter fat from the milk and the amount the creamerymen figure?

A.—There will be some variation. There is a little loss in the skimmilk, and it has been my observation *when* I have done the testing in the creamery *and* the University was doing herd testing among the farmers, they will get a little less from the creamery than when each cow's milk was weighed and tested separately and the total butter fat figured that way. It will vary in different *cases*.

Q.—I find in some places that some months I get from 10 to 15 pounds more fat and sometimes less. How do you figure that out?

A.—Well someone surely made a mistake. Have you ever tried to take a composite test of all your milk and compared it with the creamery?

Q.—A *test* morning and evening, one day out of a month and weigh the milk every day.

A.—You may pick the cow out on a day when she gives a higher test than normal, and also the other way, and that to some extent would account for the variation. I have found that you as a *rule* will recover less from the cream after the milk is separated. Just how much I can't say; it will depend upon the thoroughness of separation and the care you take.

Q.—About per cent *on* skimmilk, or rather what is close skimming?

A.—Anything below .05 of one per cent or one space on the skimmilk bottle; that means one-half pound for 1,000 pounds of milk. Most hand separators in good running order, when

milk is run through warm hardly leave one space on skimmilk bottle. About .02 to .03 of 1 per cent respectively; or .2 and .3 pounds per 1,000 pounds skimmilk.

By the Vice-President:—Don't forget the banquet tonight at Armory Hall. Mr. W. B. Rundle asks permission to tell of Devonshire cream.

Mr. Chairman:—I want principally to speak of one of the largest herds they kept in Great Britain in 1898. An uncle of mine, 25 years before that time was called to take charge of a herd in Cornwell.

The southeast part of Cornwell and Devonshire are somewhat alike. Devonshire is the prettiest country you ever saw. It is beautifully situated, and the roads are fine in Devonshire. The fields are beautiful. It is pretty hard to find a farm of over ten acres there. It is grass land nearly all of it. The grass has been from time immemorial and used for grazing purposes.

Devonshire cream is sent all over the United Kingdom. I just want to give you this record of this herd. He took that herd 25 years before. He was not farming for himself, he was what you call a land steward. He took the home farm of 400 acres. It had run down. They were only milking 10 or 12 cows at that time and not furnishing enough cream and butter for the household. He went to work and looked over the situation as soon as he could. He went to Jersey and bought the sires that he wanted and bought some thoroughbred heifers and cows, and thus began this herd. In a few years there were 125 Jerseys. The way he disposed of the milk was this way. The morning's milk is taken and shipped. The evening's milk was taken to the dairy and it has to stand so long before being scalded, probably the next day. The climate of Devonshire is very peculiar. It is very different from this country. They can keep things longer there. This cream is scalded and skimmed at the proper time and set in large pans not too deep. When time to scald it, it is put over hot water. If you boil the milk you spoil the cream. This cream is put up in nice little pats of a pound

and up to suit the customer. Averaged 45 cows milking. They were brought in at 2:30 in the afternoon and fed and then milked. That milk was sent back to the dairy and scalded the next day or the day after. The morning's milk is shipped direct to Plymouth with the cream on hand. There were forty-five cows on the average. He told me that was a little over the average. \$450.00 or over for the 45 cows for the month, ten dollars a head. In the meantime he was making money off the herd. He sells a great many cattle every year. The farmers of Devonshire are doing just the same as they did 150 years ago. One was milking 10 cows and she makes butter 3 times a week. She has to weigh this butter up  $16\frac{1}{2}$  oz. to the pound. If they take that butter to market and it is not up to weight they lose it. These women have been doing it for 50 years. Now she is selling it to what we call a middle man. They call it regulators.

Q.—You think \$10.00 pretty good revenue from a cow?

A.—Yes sir, this is a special dairy.

Q.—I have a dairy that isn't a special dairy, and the four months of the winter my dairy brought in over \$15.00 a cow.

By Prof. Lee:—If the boys who took part in the contest and butter judging will come together we will find out why there is such a variation. It is too late tonight and I am tired. Meet here tomorrow morning at 8 o'clock.

Q.—Could it be tonight, some of us have to go away?

A.—Yes, meet right after the meeting.

Adjourned until Thursday morning, January 21, 9:30 A. M.

## GET GOOD COWS.

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One enterprise of the State association during the year was to prepare a pamphlet which was mailed to 15,000 farmers in the state, the pamphlet containing the following:

The average of all the cows in the country produces 145 lbs. of butterfat a year, the value of which in 1907 was 28.13 cents per pound or a total value of \$40.78 for the year. It cost at least \$30 to \$35 to feed this average cow, so her return to her owner was \$5 to \$10.

A cow in Wisconsin, Colantha 4th Johanna, produced 998 lbs. of butterfat in 1907, valued at 28.13 cents per pound or a total of \$280.74 for the year. If it cost \$100 to feed this cow, there is a big difference between the profit she returned and that returned by the average cow.

You can't have 998 lb. cows but there is no need of having cows that produce only 145 lbs of butterfat a year and no profit in keeping such cows. Write to Illinois Dairy School, Urbana, Ill., for information about cows. The professors there will be glad to help you. They will advise you to test your cows in order to find what each is doing, and they will test them for you if you desire. They will advise you to sell the unprofitable cows, keeping only those that make a profit for you. They will advise you to get a pure bred dairy bull from good milk producing stock, and by raising calves from your best cows to gradually build up your herd and increase its butterfat production. They will tell you how and why and advise you what to feed. All the information you will need is at the dairy school and you have only to ask for it.

Dairying is a business and if good business principles are applied to it, it will return a handsome profit. Remember that the cow is a machine; that the best machine for dairying is the dairy cow and that however good the machine, she can't produce liberally unless fed liberally with the proper feeds.—Geo. Caven, Sec. Illinois State Dairymen's Ass'n.

## FEEDING DAIRY COWS.

The feeding problem is a little more difficult to solve this year than it has been for several years. All grains and by products are higher than last year, which will increase the cost of production. On the other hand, the hay crop was good and roughage is at present cheaper, but will probably go up in price rapidly. Choice hay is quoted from \$1.50 to \$5 per ton cheaper than last year. This will help reduce the cost of the ration and properly calls for a heavy feeding of roughage and a lighter feeding of grain. At the station we are often asked what to buy. This is a difficult question to answer without knowing all of the local market conditions and what roughage is available. The following table may be of some assistance in this matter if carefully studied. It is based on total digestible nutrients, according to Henry's tables, and includes only standard dairy feeds. It shows the value of the different feeds compared with corn at different prices. When corn is worth \$24 per ton, brewers' grains are worth \$20.50, etc.

Corn .....	per bu.,	\$ .60	\$ .63	\$ .65	\$ .68	\$ .70
Corn .....	per ton,	21.00	22.00	23.00	24.00	25.00
Oats .....	per bu.,	.30	.31	.33	.34	.35
Oats .....	per ton,	18.60	19.50	20.38	21.30	22.16
Bran .....	" "	16.21	17.02	17.77	18.57	19.32
Gluten feed .....	" "	24.99	26.23	27.38	28.62	29.77
Oil meal .....	" "	21.92	23.01	24.02	25.11	26.12
Cotton seed meal .....	" "	23.50	24.66	25.74	26.91	27.99
Brewers' grains .....	" "	17.90	18.79	19.61	20.50	21.32
Clover hay .....	" "	13.65	14.33	14.95	15.63	16.26
Alfalfa hay .....	" "	15.03	15.78	16.47	17.21	17.91
Cow pea hay .....	" "	11.81	12.39	12.94	13.52	14.07

The table shows that *at present prices*, corn meal furnishes the cheapest nutrients. It will not do to follow this table blindly, because it does not take into account the fact that most of us buy concentrates to get the proper amount of protein to balance our rations. Looking at it from this standpoint, it becomes a question of which feed will furnish protein the cheapest. This I have attempted to figure out, in a very limited way, and it is

based on prices which may not obtain when this comes into the hands of the dairymen. As in the above table, I have taken corn as the standard and assumed that the nutrients other than protein, and an amount of protein equal to that in corn, are of the same value, pound for pound, as in corn. Only the excess of protein per ton over that in corn meal should account for the difference in price. Calculating the cost of excess protein in this way we have the following:

Excess protein in corn .....	at \$22 per ton equals \$ .00 per lb.
" " " Oats .....	" 28 " " " .32 " "
" " " Bran .....	" 26 " " " .12 " "
" " " Gluten feed .....	" 30 " " " .03 " "
" " " Oil meal .....	" 32 " " " .035 " "
" " " Cotton seed meal..	" 31 " " " .024 " "
" " " Brewers' Grains ...	" 25 " " " .054 " "
" " " Clover hay .....	" 12 " " " .000 " "
" " " Alfalfa hay .....	" 18 " " " .048 " "
" " " Cowpea hay .....	" 14 " " " .04 " "

This shows that at these prices protein can be obtained cheapest in Cotton Seed Meal, and is most expensive in oats. It must be remembered that if prices vary radically from these, these relations will be changed. Neither should we take this as an absolute guide in purchasing concentrates. The physiological effect of the feed must also be taken into consideration. Bran, Oats and Oil Meal among the concentrates, and alfalfa and silage among the roughages, seem to be the best to keep the animal in good condition.

These three things should be kept in mind when selecting feeds: Cost, based on nutrients contained; protein needed, and effect of feed. Bran and oil meal are "loosening," and go better with corn meal, clover, corn stover, etc., while cotton seed meal is "binding," and goes better with alfalfa, silage, and corn meal.

Each dairy section has its peculiarities, and no rules or set of instructions will cover all cases. Each feeder must do some thinking and figuring for himself if he gets the best results.

C. C. Hayden,

College of Agriculture, University of Illinois.



**CARE AND HANDLING OF THE CREAM ON THE FARM.**

Cream is milk rich in butter fat. As a rule its value is based upon the total number of pounds of butter fat in a given quantity of cream.

The farmer values cream by the number of pounds of butter that he can make from a gallon. The real value should be based upon the number of pounds of a certain grade of milk required to produce it. *Example*: One hundred pounds of 4 per cent milk contains four pounds of butter fat. Removing ten pounds of cream from this milk it is not an impossibility that it should test a little over 39 per cent, while if twice as much cream were obtained it would only test half as much. The test of this ten pounds of cream will be increased or decreased in proportion to the richness of the milk, and the amount of butter fat left in the skim milk.

Butter fat is the valuable portion of milk, therefore, each farmer should be interested in saving the highest possible amount of it. This can best be done by observing the following:

1st.—Use a separator of Standard make.

2d.—Give this separator proper handling and care. Why does the same make of machine skimming the same amount of milk last twice as long for Mr. Black as for Mr. Snow? You know.

3d.—The separator must be thoroughly cleaned each time it is used. This can best be accomplished immediately after it has been used. Take it apart, rinse with cold water. Wash all parts of the bowl and tinware in warm water, using a brush. Rinse in boiling water and place the parts where they will dry and be acted upon by the sun.

4th.—Skim the milk immediately after milking. If this is not done the milk must be warmed to a temperature of 85 to 95 degrees F.

No honest farmer will knowingly offer for sale cream which is not good enough to be used as food on his own table. Having examined cream that has come from some of our farms it is not unjust to draw these conclusions.

1st.—A lack of knowledge as to proper handling of cream.

2d.—Not knowing that cream once spoiled cannot be restored to its original flavor.

If milk has been contaminated or produced under insanitary conditions, it will show itself in the cream. Milk must not be exposed to the odors of the barn any longer than is absolutely necessary. It must not be handled in vessels that have not been thoroughly cleaned.

Cool the cream as low as possible with well water as soon as separated and half the battle has been won. A proper place should be provided for the separating and storing of the cream.

You cannot expect to separate the milk in the barn or kitchen without getting at least part of the odor of that room into the cream.

This place should be large enough to house the separator and a tank. The water in this tank should be changed at least twice in 24 hours, the oftener the better. Place the can holding the warm cream in this tank of water, stir the cream occasionally for the first hour. After that it can be kept tightly covered. Never mix a warm lot of cream with the cold cream, but cool each skimming before mixing with the quantity already on hand and stir thoroughly.

Skim a cream that will test from 30 to 40 per cent. If 40 per cent cream is skimmed it will leave more skim milk at home. The cream will keep better and there will be less cream to care for and transport.

Do not keep the cream too long before sending it to the market. Each day added to its age will decrease its quality.

Do not think that because cream is nearly sweet it is all right and need not be delivered. Bitter flavors may be developing.

If the cream is sold to a creamery, you get paid for the pounds of butter fat not the pounds of butter made. The difference is about one-sixth.

Carl E. Lee,

Illinois State Dairy School and Experiment Station.

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**BANQUET.**  

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Held at

Armory Hall, Clinton, Illinois.

January 20, 1909.

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Mr. L. N. Wiggins, president of the Association not being able to be present, Mr. Shilling of Chicago acted as Toastmaster.

Song by Mr. Jules Lombard. Encored.

Mr. Shilling: Mr. Chairman, Ladies and Gentlemen. The first thing I would like to do would be to get you a little closer together. I can make most of you hear, but I fear those at the other end of the room cannot hear.

I don't know what excuse to offer for being in this position. Some one has shoved their responsibility to me. According to your program, the president was to have been the official toastmaster. I feel like the newly married man did who was called upon to deliver a toast at his wedding feast. He was bashful, but was pressed to say something or other. He said that for the life of him he didn't know how he could say a word. They insisted, however, and he arose and with his right hand resting on his bride's shoulder said: "Ladies and Gentlemen, this thing was thrust upon me."

I want to congratulate you on one thing. For the first time in the history of your city you have eaten of butter that was made in your own city. Now that is worthy of an encore. If you people of this city appreciate the creamery as we do in the north, you certainly would let that encore be long and lasting. Next to our churches and schools, we think more of the cream-

eries than anything in the country. We do so because they have made us more money than any other industry. I want to say to you, you do not appreciate this yet. I am not paid for this. I believe in it, but I want to say you do not half appreciate yet what that interest means to you. You will do so some day. Like myself, you will take the stand, that aside from our churches, our schools and our homes, it is the best institution we have. Judging from the character of the butter, it is not just like what the woman sent her boy to the grocery to get, because its better. He went to the grocery and had been told to tell the grocer his mother wanted the same kind she got a week ago. The boy goes a little further and said: "Mother wants the same butter she got a week ago. Got a whole lot of relatives and she wants to get rid of them."

To start with, I am commanded by the management to shoot any man who talks longer than two hours and a half. We have ten speakers on the program. I don't know but what I might tell another story. It has no particular application. I read it the other day and will tell you about it. It is a political story. It is the old negro's deductions of the political parties. He compared them to the hickory nut. The hull is green and no one wants it; it is just kind of in the way, that's the Prohibition party. I don't suppose I ought to tell this in Clinton. Then there's the shell, that's dead, that represents the Democrats. When we get inside we find the meat, the sum and substance, that's the Republicans, but nine times out of ten its rotten. (Applause).

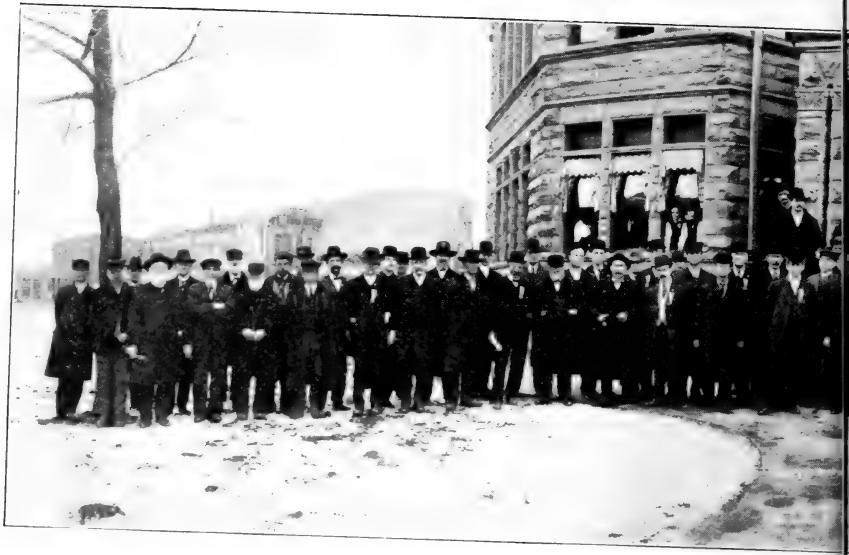
The first man that I wish to introduce to you this evening is a character in the dairy world. I say in the dairy world, although I am not old; I am gray headed and bald which comes from family troubles. Ever since I saw this man he has been a light and entertainer in the dairy world. He has attended conventions as long as I can remember. With only two exceptions in the last 30 years he has been at these conventions, and that is as long as I dare tell about. We feel in the dairy world that a convention is not complete without Jules Lombard, and he will sing to us.

Song, Encored.

Toastmaster:—If there is any one I am sorry for, it is the mayor. I understand that your mayor gave us a cordial and hearty welcome to your city. I got to tell a story on the doctor. It happened right after election. The account of this was in the paper. Mr. So and So in a small town had made up his mind since the election to go away to some sanitarium for appendicitis—in fact the doctor advised it. If Bryan had been elected he would have stayed at home and been treated for stomach ache.

Let me introduce Mayor Edmundson.

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**MAYOR EDMUNDSON.**

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on

**DAIRYMEN GOOD CITIZENS.**

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Mr. Toastmaster. Let me get back a little and say that the mayor is used to being roasted and it doesn't hurt. I have been reminded of a little story I heard several years ago about a young man attending college and some one sprung a joke on him. It was supposed to happen during the campaign of Hayes and running mate for the presidency. The man asked this young college fellow, who was very bright, "Suppose you had a young lady in Washington and she couldn't walk, and the railroads were all torn up, and there was no water navigation, nor horses and buggies, or any other means of conveyance, how could you get her away from there?" He said he didn't know. The fellow says; "Very easy, just get Hayes and Wheeler out". So the young man went home and thought he would spring it on his father. He recited all the conditions that existed and asked the old man how he would get her out. The old man thought a minute and said, "I expect if you proposed to her she would back out." I feel that, according to the remarks of the toastmaster, some one evidently has backed out here also. But that doesn't release me from this task.

It is really a pleasure, but a duty after all. You know it is not my business addressing dairy conventions. It is said everyone should know something of everything and everything of something. I would be very pleased to tell how much I know about milking cows, etc., but I feel you might feel about me as the politician did who campaigned for a very high office like U. S. senator. Addressing a congregation in the country composed

mostly of farmers, he told them how he used to be a farmer and how much he knew about it, and finally he says; "Gentlemen, I was raised between two corn rows" and a farmer spoke up; "By thunder boys he's a pumpkin." I would also like to tell you something about butter. I am reminded of another story of the boy who was told when he went away from home it was good form, if he saw something pleasing or especially nice, to say something about it. This young man when he sat down to his friend's table, saw that they had Shady Grove creamery butter on the table. "That's pretty nice butter what there is of it." The people at the table all looked at each other and it rather inclined him to spread himself and he continued: "There is plenty of it, such as it is."

I have been asked to talk on this program because I occupy the position of Mayor, and it sometimes gets a man into unpleasant difficulties. If I am to talk that way, I have nothing to say excepting to brag of the city and say all the nice things I can about the city, not however, about its management. But the first thing I will brag about, is our educational advantages, our public schools which are unexcelled. They are as good as any in the United States and under as good government and control. We have a high school building which will soon be occupied that is unexcelled in any town of this size in the state of Illinois. I am sure of that because it is certainly a model. Our churches are as good as there are in any other towns under just as good management and have as good attendances. Our library, which is a gift from one of our own citizens is splendid, and we are all proud of it. We have a summer resort near us where we all unite in making our Chautauqua a greater and grander success than any of our neighboring cities. We must not leave out the Illinois Central shops and all the business it brings here and means to us, and whose superintendent is one of our number this evening. We must not forget an industry that has been here many years and which gives us many of the comforts in hot weather which is our ice plant, and we are all proud that they have added to their business the Clinton Creamery Company, which bespeaks for itself a great future. We feel it stimulates

a new business enterprise. It supplies our local merchants, or should supply them and all the immediately surrounding towns with its product, and should stimulate the farmers to enter into the dairy business more extensively in order to supply the demand here. We desire at this time to thank the State Dairymen's Association for the honor that it has conferred upon us in meeting here. We are glad to have had you with us, and we appreciate it. It means a help to us, and we hope sometime you will see fit to come back again.

Toastmaster :—The next who will address you is a creamery man. I come from a section of country where the creamery business has been in all stages of its development, and in its early history we met with a variety of experiences. One of the principal things that used to bother our creameries was returning skim milk. We are farmers and we are honest all right, excepting when it comes to the skim milk question. But there is something or other, some relation between the average farmer and skim milk, that he will take more than his share of skim milk in spite of anything you can do. An ordinary farmer you can trust, but turn him loose on the skim milk pump and he never knows when to quit. We had an old deacon that was a member of our creamery. He was honest to a cent, but he did have a faculty of getting more skim milk than belonged to him. He was brought up time and time again before the board of directors. The old gentleman was penitent. He got up and said: "I believe that I did take too much. I know that I did, but when I get to thinking about the goodness of God and working the pump handle, I work too long." Here is a man who can tell you all about the creamery business. I take pleasure in introducing Mr. Joseph Newman, of Elgin.

Mr. Newman :—Elgin District Dairymen. Mr. Toastmaster, Ladies and Gentlemen. It is always a pleasure to speak a word for Elgin. Elgin has been the home of the creamery industry in the west for about forty years. There is a bond of sympathy between Elgin and Clinton tonight. Elgin is probably the oldest in the creamery business, and Clinton is the newest and

youngest. A year or two ago we sent one of our dairymen down here, and I can prove to you that he knows all about the dairy business, knows how to milk cows. I refer to our old friend "Sudy" as we call him in the north, I presume he is Mr. Sudendorf down here. There was a time when he lived in Elgin that he was working too hard and had to take a recess. He is one of those nervous fellows and has to be doing something, so he took the doctor at his word and took a vacation. He goes out to a farm on the edge of Elgin and asks for work. He was white and sick. The farmer saw him and Sudy asked for a job. He told the farmer that the doctor said he was sick, but he wanted to go to work on a farm. "What can you do on a farm?" "I can do anything." It happened the man came out with a milking stool and pail. "You take this pail and this stool and milk the cow and bring the milk to the house," says the farmer. "All right," says Sudy, "Anything that man can do I can." He goes down to the pasture. An hour passed by and the farmer happened to think about the milk. Says he, "I better go down to the pasture." He goes down and when he got near the fence, there was Sudy with a pail on his arm and racing around after that cow. The farmer asked him what he was doing. "I thought I wanted you to milk that cow." "I will," says Sudy, "when I can get that cow to sit down on this stool so I can milk her."

I want to say to the citizens of Clinton that anything you give to that man to do, he will undertake to do it, and before he gets through with you, he will do it. You have another connection between Elgin and Clinton and it is this. I saw an advertisement of this Shady Grove Creamery and asked where it was. I was directed to a side street and into the basement of a building, and who do you suppose I found down there? The son of one of the oldest buttermakers in the state of Illinois, Mr. Remington. I was very glad Mr. Sudendorf was fortunate enough to get such a man here. You need have no fears that the cream taken there will be improperly handled. The money will be forthcoming and I predict it will be a success before many years.

I am very glad to speak of Elgin tonight. Of course Elgin and the dairy business goes back farther than I can remember.

When I was in the cradle the dairy business was there. I could picture to you a gentleman in the middle age of life who had started then in the dairy business, Phineas Smith. I think he made and carted the first can of milk to Chicago. The people of Clinton now look at the starting of this creamery, and I apprehend when five years have passed over, you will see a magnificent creamery here turning out the butter by the wagon load every week.

Another thing in regard to Clinton and Elgin tonight. You have the Illinois Dairymen's Association with you here. We want it next year in Elgin. I have been connected with this association I think for about 20 years or more, and during all that time, the principal city in the dairy business in the state has never been able to obtain this convention. I believe Elgin could give you the support a convention like this should have, and larger numbers than Clinton can give us as it is a larger city. Elgin is intensely interested in the dairy business. It is so near Chicago that you people from the central part of the state and from Iowa would be glad to come to Elgin, and we would treat you right. There are quite a number here from our city, and I believe they will bear me out. If you will only come, we will provide all that is necessary to entertain you. This will be brought before you in the proper manner.

Of course, the dairy interest in the north is more intense. All the farms there are given over to the dairy work. In Kane county I doubt very much if there are 100 farms that are in what you call feeding or stock farming. They are, practically, all dairy farms. A great many of them turn out 10 to 20 cans of milk every day the year round, winter and summer. We have with us a gentleman who is on his own farm, and he tells me he is shipping 41 cans of milk every 24 hours. He is probably the most economical producer of milk in this state, if not in any state. Of course, I could go on and recite these incidents of the Elgin district, but you have speakers here who can tell you stories galore, and I believe Mr. Chairman I will give way. I thank you for giving Elgin a place on the list.

Toastmaster:—Is Mr. R. A. Lemon in the room? I am sorry he is not here. He was to talk on the Dairy Queen cow and King Corn. The king corn probably applies more to you people than it would to a person from the northern part where we do dairying. The Queen cow is above everything else on our farms.

I don't like to see a man get so many eulogies without something being said a little on the other side of it. I have got to tell a story on Sudy that they tell outside of here, and they say it happened here. His team was delivering ice on a certain street, and came to a certain house where there was a new baby. But they had no scales to weigh the baby and they shouted out of the window and asked if they could borrow Sudy's scales off the wagon. He very obligingly loaned them and when they weighed the baby, it was found to weigh 65 pounds. I simply give you the story for what it is worth. Now, in the absence of the gentlemen who should have responded to this toast, we will call upon Mr. Lumbard for a song.

Song:—Mr. Jules Lumbard. Encored.

Toastmaster:—We will now have a selection from the orchestra. The next subject is the biggest subject we have tonight, "What I don't know about dairying," by Mr. Donoghue.

Mr. Donoghue:—What I don't know about dairying. Well, that's me. I was listening to the splendid song sung by Mr. Lumbard, and he looked to me as one who had just stepped out of the glorious past. I have known him for 40 years, and he sang as sweetly tonight as he sang then, and we all hope that he will continue long in this life, and sing on forever in the better land.

An ordinary man or lawyer knows mighty little about dairying. I milked cows in 1848, that was some time before some of you were born. The cows were different sort of cows, large legs and big horns, lordly cows, and they lorded it over me too. We had, in the first place, four-legged stools, and we sat on those stools to milk, and the first thing you know, in a moment of



mental aberration the old cow would put her foot out with great rapidity, milk bucket and everything else would be disseminated in the air. In the progress of time we made a stool that only had one large leg in the center. I used to like to milk 5 or 6 cows and work all day plowing until the sun went down. Now you live like kings. We worked all day and then milked the cows. Sometimes the cows would be out on the prairie or in the timber and the girls and boys would get the cows and under the silent evening splendors those maids and boys would follow them home. They have never passed from my memory. They are beautiful to me yet and the memory is sacred in me. We had cattle, that came from the Lord only knows where. We hadn't been to Elgin, and we hadn't been to Decatur, or St. Louis, but those cows gave the finest milk and they made the finest cheese. We had some Yankee women and they wouldn't have nothing to do with us; they didn't come from the same country at all. They made a cheese place out of some logs and one thing and another, and they made good cheese too. So it went on until '55 when I left the farm, but I tell you now this dairy business is quite ancient. It commenced just after Adam and Eve got driven out of the Garden of Eden. In Judea and Asia Minor the race lived upon milk, so did Mr. Abraham and Mr. Lot. He wanted to make all the money he could. Abraham was a lofty character and like a great and splendid mountain on which the sun shines forever. He said to Mr. Lot because their servants fought and fought they better separate. Abraham said to him: "You take the right and I will take the left", and Lot lifted up his eyes and beheld Sodom was fair as the garden of the Lord and he journeyed toward Sodom. They raised flocks and herds. All that country raised flocks and herds so you see your business is not new. Your thought and energy is expended along new lines of the 20th century. But these people lived and ate of the butter and products they had and grew a race that made history sublime. That race produced great generals and all along the history of time has had its powers in the legislature of every state. How did you get along without milk? How would you have lived? Not at all. Now Sudendorf has started a creamery. He must

have been a magnificent man at Elgin and am glad to welcome him to Clinton, because we want more magnificent men, although we have a great many of them. If you will count up the statistics of your country, you will find the product of the cow fills an important place in making men and women and giving them something to eat. Other people may brag about their beef and corn, but you are talking about the milk, and you have exhibited in you generosity the milk of human kindness which is better than all the rest. The Lord bless you and prosper you in your kindness of heart and may prosperity dwell in your palaces forever.

Toastmaster:—There is really something to come yet better than all the rest we have heard. Mr. Lumbard has agreed to sing "Maggie."

Song:—Mr. Lumbard.

Toastmaster:—There is another speaker not here, Mr. Edward Sweeney. He is an old bachelor. Personally, I have no time for that class of people at all. We have with us two more on the program. The next one is a member of the faculty in the state College of Agriculture. I want to say this, that if you have the same pride in your state college as we have, you will be pleased to have the opportunity to listen to one from that institution. Allow me to introduce Prof. Lee. Before he commences to talk, I have one more story to tell and it is positively the last. I have told you something about the troubles we were having in getting a fine quality of butter. It has always been a question to improve the quality. When I was a buttermaker I tried to instruct my patrons, but I didn't have the discretion I have now. I decided to go to the patrons' homes and tell them to do better. The first patron I went to was an old Irish woman and my purpose was to tell her her cream was bad. The first break I made was this. (Her name was Downey. It was a good many years after before I saw any fun in it.) I said to her, "The cream you are sending to the factory is rotten." I got out in a hurry. That was 20 years ago and my hat is there yet.

Prof. Lee:—I am reminded of the man from Illinois who went to Kentucky for the purpose of buying a horse. A man down there started to show him what he had. He said, "This one did splendidly last year." Then he told the step and the performance of another horse and took up considerable of the gentleman's time, and finally they came down to another barn. He showed him a fine string of horses and colts. He said, "One or two years from now they will take anything in the country, and here is one that will make a mile in less than two," and so on he went down the string. The Illinois man finally got a chance to say, "I don't care a rap what you have that did so well last year, or what you got that will do so well next year, what I want is an *"iser."*

I hope when you send your young men over to your own University, and we take them under our tender care, that when in three years from now they return to Clinton they will not find what the young man in Kentucky found after he had left home and gone to Kansas for three years. A young lad when he first leaves home always remembers what he had at home. He went to Kansas and after spending three years in that state, he went back home. Of course he wanted to see his father and mother. He told them how glad he was to see them, then he excused himself and said he would have to go and see the old horse he used to drive, and he wanted to see the cows and everything his father had when he was at home. He saw the horse and it recognized him. He saw the cows and they were the same. Before he returned to the house he remembered his father used to have some hogs. He got over into the hog-yard and looked at them and didn't say a word. He went into the house and said, "Father, I can't understand the lack of appreciation you have towards what we call progress and accumulation of wealth. Now the three hogs you had three years ago are still there. Why haven't you sold them and put in some new ones?" "Well, my son, we simply keep them to eat up the swill."

Shady Grove butter is a new thing in Clinton. If you had all been near me you would have remembered what I said five years ago. If butter was good, bread would be thin, but if butter

was poor, bread would be thick. I don't need to say anything about the Shady Grove butter, what it will be in the future; but, it was the part on my bread tonight that was thick.

I am sure you all know what we have at Urbana. What we have there is yours. We are very proud of it. The dairymen of northern Illinois are very proud of it and Southern Illinois is proud of it, and I know that the people of Clinton will feel the same towards us when they realize how big this business is. I could go on and tell you several stories that would fit directly into this work, but before I sit down, I must tell you what happened to me one time when I visited one of our numerous northern creameries. I hope the time will never come when I will be called on in this vicinity to do a similar task. Just as the sun was going down, I called at the home of a prosperous farmer. He was not one of the kind referred to that took more skim milk than belonged to him. He was not satisfied with returns. The creamery company was not just satisfied at what the man was bringing in. I was called upon to do this one thing. I couldn't make that man understand that the best way to get along in this world was to treat others as you would have them treat you. He was like the man who did you and did it first. The woman of the house was doing the milking. I always figure to get at a place at milking time. The cows were ordinary looking cows, red ones and some spotted ones. I couldn't see anything wrong with them. I took a sample of the milk from the first cow and the second and by this time the man got home.

"What are you after?" he inquired. "I am after information."

"This isn't the place to get it." "Well", I said, "I have gone to the trouble of coming clear out here to see what you are doing, and I am going to stop here".

He was suspicious of what I was after. He unbuttoned his coat, but I told him he wasn't big enough.

"I don't water my milk." I said, "I haven't said you did."

Well he said, "I should judge from what you are after, that something was wrong".

"Something is wrong. I am not saying you are watering your milk, I am going to find out if the cows are giving water in place of milk".

The farmer became very anxious and could not wait. "I might as well tell you I did water my milk".

"What for?" I asked him.

"To cool it."

I told him it was a poor policy, that he had better call on the iceman, or, better still, to sell what comes direct from the cow. I know from what I saw delivered this morning that your purpose is not to cool the product, but that of getting back a lot of skim milk.

He said, "I can show you I am not watering the milk very much. You come to the milk house and I will show you how much water I put in an 8-gallon can." He picked up a can cover and said that was the amount of water he put in each can. His young son stood beside him and he said: "Papa I thought you put a pailful in each can."

Toastmaster:—We have with us another man who is almost a national character. I was going to tell when I introduced him that I had kept the best until last. I take pleasure in introducing Mr. Marple of Chicago.

Mr. Marple on Dairy Boys:—A man went to a physician to be treated for a disordered stomach. The doctor told him if he would drink hot water an hour before breakfast, it would help him. On seeing him a few days after and asking how he was getting along, the man said: "I will drink hot water ten minutes, but I can't drink it an hour."

I am not always ready to talk, but I am always interested in the funny side of a situation. I tell you honestly tonight that I am situated a good deal as the man was who went with his wife to a fashionable ball. Just before he entered the house he fell down and cut his clothes across the knee. She said to come into the room where the ladies took off their wraps and she would pin it up for him with a safety pin. When she examined the rent, she found that it was more than she could pin up so as to hide it.

She told him he would have to slip his pants off and she would sew it up. He did and she opened a door when she heard some ladies coming and told him to get into the closet quickly. The ladies came in and the man commenced to knock on the door for her to let him in. She said there were ladies in there, and he said: "I don't care who is in there, I am in the ballroom."

This is the second time I have had the pleasure of meeting with the Illinois Dairymen's Association, and I was asked tonight to talk a little about the Illinois farmer boy. The highest honor to be conferred on me is to be asked to talk upon that subject for a little while. I am satisfied he is not treated exactly right, neither is his mother. The next time I have the privilege of attending a dairy association in the State of Illinois, I should like to have represented that class of individuals upon whom we must depend for the continuance of this business. I have in my desk at my office 1,000 letters from boys. The most of them come from boys who live in the State of Illinois, and it would surprise you to read those letters and to see the exercise of judgment by those boys carrying on this world's business. You remember what Josh Billings said, "The more I see of men the better I like dogs." The more I see of men the better I like boys. I could tell you a story I listened to. It was told by Gudchell of Topeka, who has charge of the newsboys of that city. By his aid in that city 1,600 boys have joined that organization and he talked to me for an hour and told of the most wonderful things accomplished by the organization and direction of the boys of that city, and the majority of them were selling papers. I want to say to you, ladies and gentlemen, that they have recently completed in that historical city a building, put up by the newsboys that belonged to this organization, and it belongs to them. I don't believe that we fully appreciate the importance of boys. I have just come from a State Dairy Association where a paper was read by Mr. Pile of Missouri, and he said in that paper that the style of their firm was Pile & Son, and the son was eight years old. I would ask you to take these boys into your counsel and the deliberations of these meetings, and inculcate into their minds, which are so receptive, the basic principles of the best business in which the

agricultural interest of this country are engaged. When I hear a story of a boy, it is always a good one; you can make up your mind to that. Whenever I hear one, I have a little book that I put it down in. I tried to remember them all for they all have a point to them. A boy was called into the bedroom to see his new sister. He looked for a little while, and his father said to him, "What do you think of her." He answered, "I think it is pretty near a failure". The boy's grandfather took him to task for eating butter with jelly; told him it was extravagant. He told her he thought it was economy as he was using only one piece of bread.

It is remarkable the ideas they have and the judgment they have. I told a story the other day to a friend of mine whose boy had run off. He had a few dollars and thought he could sell papers. He had no place to sleep. A friend of his went to his father and said: "I know where your boy is." The father said he wanted nothing more to do with him. "That is wrong. You haven't treated him right. If he comes back and asks your pardon you ought to take him back." "Well, go get him" and he did. The point I want to make is this. The impression he had made on that boy all his life was to study economy and when he gave him 25 cents or 30 cents he wanted him to account for it. I hope there are no ladies here whose husbands call them to account. I wish there were more companies in households. I would have you ladies understand that I regard you as part of the company in every household. The idea of you giving account to the one who calls himself boss in that family and asking him for money that belongs to you! It is the same about the boy. I try to teach my boy that the money I make is part his and my girl's and I don't want them to tell me what they spend that money for. My pocketbook is open and there is not much danger of them spending too much for there never is a great deal in it. What there is they have access to and I never had to be ashamed in consequence of any expenditure they have made with it.

You have conferred on me the highest honor that could

possibly be conferred, by asking me to talk about the Illinois farmers boy. In conclusion, this boy has always been taught in the public school, when talked to by the teacher, that there is a chance for every boy to become president of the United States, and that seems to be the highest ambition. I admire the boy who, in a crowd the other day when he was told that, said he would sell his chance for ten cents. You can't fool that boy and you can't always fool his mother.

I will tell you of a man who tried to fool his wife and let you see how he came out. A traveling man, whose wife was suspicious that he was too free with waiter girls at hotels where he visited, told him she would like to take a trip with him over his territory. She made the trip with him, and when about through he knew what she went for, because in the thankfulness of her heart she told him when about nearly home. She apologized to him and told him she was satisfied that the love he bore her made him never think about any one else but her. When she had made this confession they were taking their last meal at a hotel and when he gave his order and it was brought to him, he found among different things he had ordered, one item that had been left out. That was honey. When the waitress came he asked her where his honey was and she said: "She ain't working here no more."

Toastmaster :—The next will conclude our banquet. I wish to thank you and to compliment the citizens of Clinton for coming here and taking part in the exercises this evening. When you come out and assist it is always remembered. I take it upon myself to thank you on the part of the Illinois State Dairymen's Association for your kind consideration to us this evening. Mr. Lumbard will sing again for us.

Song. Mr. Lumbard :—This is my first visit to Clinton, and I want to add something to the speech made tonight by the mayor. He spoke of the advantages of this city, educational, churches, etc., but he failed to mention the chief characteristic. He should have said Clinton is populated by men of heart and men of head.

Orchestra selection closed the program.



THURSDAY MORNING JAN. 21, 1909.

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President in the Chair:—We will come to order. We are a little shy on numbers, but the interest is here. I will appoint as a committee on nominations, H. E. Schuknecht, LaGrange; E. G. Mallory, Freeport; J. R. Biddulph, Providence.

We have three speakers who are experts in their line. Dr. Wright is with us and Mr. Schuknecht and Mr. Marple. We will not follow the program exactly, but open the session with Mr. Schuknecht.

#### PURE DAIRY PRODUCTS.

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By

Mr. H. E. Schuknecht, LaGrange, Ill.

Assistant State Food Commissioner.

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Ladies and Gentlemen:—I have been trying to find some excuse for saying anything to you this morning, but I haven't found any good excuse why I should take any of your time. You all know, from the things I have said in the past, what we have been trying to do in the State Food Department. Under the law, you all understand the Illinois law is so drawn as to be a police measure. Reduced to practice, it is a protective measure to the dairy interests of the State of Illinois. It has some educational features, and consequently in our work we have gone comparatively little outside of purely police work. We have found more of

that to do than it would seem probable existed in as old a dairy state as Illinois. Nevertheless, we have found much work to do, and I believe we have the foundation for further work so thoroughly well laid as to have reduced the whole question to one of simply applying the forces, the matter of collecting evidence and bringing about a correction of the errors we have found. The oleomargarine law which prohibits the sale of oleomargarine colored in the state of Illinois, was at one time considered practically null and void. At the last session I was able to tell you we felt we had done sufficient work so as to probably have established in the minds of the violators or sellers of oleomargarine the fact that the law was good law. There still seems to be some doubt about it as we were at that time still being threatened of carrying cases to the Supreme Court and fight every inch of the way. I am justified in saying that that stage has all passed. We have collected something like 125 fines under the law. We have invited our enemies to fight the law and carry the cases to the Supreme Court. In spite of all their threats we have had no cases carried up. They have all been very glad to pay their fines. With that as a precedent we feel satisfied we can go before any court in the state and have the law upheld. That was the largest question and deals with the largest amount of detriment to the dairy interests. From my standpoint it is gratifying to know we have established that fact and there is no question in our minds as to its being called law, and good law. Fortunately there is a jail sentence attached to the penalty—the courts may send a violator to jail. In that connection I am glad to say we find the municipal courts in the city of Chicago rather inclined to enforce the law as they find it; that is to say, while any court is very slow to take away a man's liberty, the general trend of feeling in Chicago courts is if a man comes up numerous times charged with the same offense, and there is a jail sentence attached, they are just as likely to inflict it as not. In our last cases the court made this remark: "Has this man been up before?" "Let's make it the maximum fine." While the court was finally argued out of that position, it shows the tendency of

the feeling of the courts in the city toward those flagrant and continued violators of the law.

There is just one feature in connection with that law that has developed since a year ago. The question has been raised as to the scope of the law. I took the position that it applied to every possible manner of exchanging the product for money or barter of any kind. It applied to restaurants serving it to its patrons. Of course, we immediately met with arguments to the contrary. It was contended that it did not apply to a situation of that kind. We tested the cases and collected some evidence against restaurant keepers in Kane county. It was taken before the Grand Jury and indictment returned, and the case fought out. Our enemies hired as able counsel as could be gotten. The result in the case, however, was a conviction. The charge in that case was a restaurant serving oleomargarine with a meal without advising the party that the product was oleomargarine. That was the charge and it was argued that a great many laws where similar cases had been decided the court had recognized a specific provision regarding such sales in restaurants. The court in his instructions said that regardless of whether such a provision was contained in the law or not, an article served as part of the meal was sold and it could not be argued that the article was given away with the meal. It was a sale pure and simple. That establishes the fact that the oleomargarine law is good in every phase in the handling of the product in the state. It remains now only a question of collecting evidence and prosecuting the cases. On that score it is fair to say that Illinois being the home of the oleomargarine industry, the problem is of such tremendous proportions that a force of simply 12 inspectors to cover all lines of food products in Illinois is entirely inadequate. They cannot possibly cope with the situation. But I will say again, I don't urge that as an excuse for not doing the best we can. We surely have done the best we could. My judgment is that he who makes the best possible use of the things at hand places himself in the best possible position to ask for more things to work with.

In the case of the milk supply of the various cities in the state, the situation is now in a fairly satisfactory condition, whereas we found in 1906 milk all over the state very freely adulterated with formaldehyde and various preservatives. Adulterations of that character during the past year have been reduced to less than 1 per cent; that is to 2-5 of 1 per cent. That of course is down to where it is practically perfect from that angle.

In our work in the past year we found that in quite a fairly good section of the dairy district there are still most excellent wells and pumps in perfect condition and splendid working order. The old pump has been a splendid stand-by. We don't find the pump in the milk, but the product is quite evident still. It requires very careful work on the part of the inspectors and food department to prosecute cases of that kind successfully. In all of these cases the law provides that we must send out a notice of hearing and let the party accused have a chance to explain his position and show why we should not prosecute him. Some of the excuses are very amusing. I told this one last year but for the benefit of those who were not present, I will repeat it. In northwestern Illinois a gentleman was sending milk to a cheese factory. The inspector happened to get there when the milk was rather thin and sent a notice of hearing. It showed about 25 per cent water. The fellow came to town and by the time he got to the office it seems he had been dropping into doors of various character trying to find the food department. Numerous thirst parlors had seen him and he had imbibed very freely and was a little the worse for wear. At the hearing we said: "Well, Mister, this thing looks very much like a blunder."

"Wasn't water in that milk?"

"Well, I will tell you straight, fellows. Is it against the law?" "Yes," I said.

"I didn't know I was breaking the law. I put the water in there all right, but I wouldn't have done it if I thought I was breaking the law. I only thought I was breaking the creamery-man."

Another instance came up this past summer, where a fellow was selling watered milk to a creamery. The creamery was buying the skim milk, and we sent a notice to this fellow. I said, "Colonel, why did you put the water in the milk?"

"I will tell you. We sell by test. We get paid by the amount of butterfat in the milk. I didn't suppose the creamery-man would lose anything on that."

I said, "Isn't it a fact that he buys the skim milk?"

"Yes, he buys the skim milk and he keeps howling about not getting enough skim milk and I thought I would help him out."

Those are some of the amusing things we get.

My subject this morning is pure dairy products. I take it that the addition of adulterations that makes the product impure, and things of that kind are what the dairies of the state of Illinois ought to be protected against. We have done the best we could with the means at hand to give relief on that score. There are worlds of work to be done in that line yet. I am convinced, from our past experience, that the practice is very much greater than the average public of the state ever dream of. I don't like to admit that, but what are you going to do about it, when you have the figures. One other fellow tried to explain his position. We had charged him with violating the law in furnishing milk below the standard in solids. There was no question in our minds about his adding water. He went to a firm of attorneys and got them to write the Food Department a letter. The letter seemed to indicate that we were impugning the man's character. It said: "We have known John Smith for so long; he has been here for 30 years and always regarded him as an up-to-date and honorable citizen." We don't feel that he intended to do any wrong, but he advises us that the gentleman who was in charge of this milk station was in the habit of giving very poor weights. The farmers discovered that they were not getting credit for as many pounds as they delivered. They got together and wondered how they could remedy that. In order to get even they added water enough to about make up the shortage in the weights they were getting.

We suggested to him that that was a rather a poor method of trying to get even for getting short weights and that a Justice of the Peace would advise him what it cost to practice things of that kind. He paid his fine and got the receipt.

These are some of the various excuses, but it serves to illustrate to us that science has progressed so far as to make it a certainty that we can discover whether milk has been tampered with or not. In spite of the fact that 88 per cent of the average normal milk is water, yet we can tell whether the water is added or whether the cow put it there.

Now for the benefit of the DeWitt county people, I want to add a few words to what was said last night at the banquet about the establishment of a creamery in Clinton. I regard it as one of the greatest things that ever happened in the city of Clinton and DeWitt county. I have not gone very long down in the matter of years in this life but it has been my good fortune to see the creamery business and the dairy business from its infancy in the state of Iowa and in the state of Minnesota. The first creamery built in Minnesota was patterned after a creamery in Iowa to which I was hauling milk for my father at the time. Three years after that time I went to Minnesota and engaged in the business of learning buttermaking there and there were just a few creameries in southern Minnesota at that time. There were very few barns around the houses, and I am advised that the records in the court house showed an enormous number of mortgages covering the entire county with only rare exceptions. In less than ten years that county was looked upon as one of the best dairy counties of the west, and I defy any man to show me anywhere a more prosperous community than that was in ten years from the time the creamery started, and it is so today. The farmers have money in the bank, and I know the bankers hardly know what to do with the money. The banks are sending it out in quantities to newer sections where they have better opportunities of loaning it. No one there wants money any more, and the blame for it all lies with the good old cow. Their soil was becoming impoverished from the continuous cropping of wheat

and other small grains. The land now is in better condition than it was fifteen years ago.

As I said before, they all have money to spare. Now, we are not in a state of poverty about Clinton. I don't think for a moment we have that situation to deal with, but there isn't a piece of land anywhere in the world, unless it might be the valley of the Nile, perhaps, that will stand perpetual cropping without replenishing the soil with the things we take away from it. De-Witt county is not any exception to that rule.

No one factor in the agricultural life of this country has done so much toward prosperity as the dairy business, if viewed from every angle that pertains to the business. The dairy cow has never seen an equal as a money-making proposition.

Now, right along that line I am reminded of our friend, Mr. Marple, when he talked about the boy, the boys of this country, the boys of Illinois. I have a little boy five years old, and in childish prattle have asked him what he wanted to do when he grew up. When three years old we spent our summer vacation in southern Minnesota. That little boy, every time I have asked him since what he was going to do, says, "I am going to be a farmer." If my boy continues in that wish, I shall do my level best to give him an opportunity to become a farmer. There isn't a business in this country today that offers the future that scientific agriculture offers, scientific dairy farming. Our friend, Mason, of Elgin, has set the pace for keeping a cow per acre and raising practically everything he needs to feed the cow with, and wants that cow to procure one-half can of milk per day. Says he is doing that now and wants to do better. That's the thing that is being accomplished by a man who has studied his business. Compare that with the average that is being accomplished, and I say to you that no business in the United States offers the opportunity for advancement, for progress, that the farming business does. I say again, my boy cannot confer a greater honor upon me than to continue to express the wish that he wants to become a farmer, and I will agree right now that I will do all I possibly can to get him started in that direction. I am thoroughly well

convinced the biggest opportunities are on the farm today. The various walks of business life are crowded and while it is true there never was a greater demand in business for thoroughly competent men at good salaries than there is today, yet the pressure from all sides in a competitive way in the business life is greater than to start out to make a remarkable, thorough-going success of farming.

I can't think of any excuse for standing here any longer. I have gotten this talk out of my system and there are better things to come, and for your kind attention I sincerely thank you.

By the President:—We have been fortunate in having Mr. Schuknecht as our assistant food commissioner. He has helped to get us a brighter future on all dairy conditions in the state. We can lift up our heads and look at some of the neighboring states without a blush. He has put it to us very forcibly and hasn't used a pinch of salt on what he has told you. Our extreme regret is that we expect to lose him but he is with us in the interest and spirit. We are losing a most earnest worker in official capacity, and some day hope to see him at the head of the department with which he has been connected the past two years. He is thoroughly fitted for that position.

By the President:—We will now have the pleasure of listening to Mr. Marple of Chicago.



THE ILLINOIS DAIRY COW.

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W. W. Marple, Muncie, Indiana.

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A lawyer once said he would rather defend a guilty man than he would an innocent one because if he lost the case he didn't feel so badly about it. This explains my situation exactly on this occasion. The most eminent surgeon never presumes to perform an operation on his kin. His sympathy unnerves him and his fear of a mistake unqualifies him for doing good work, so I ask your indulgence today for any mistake I may make in presenting the claims of "The Illinois Dairy Cow" on the grounds of my close relationship to her and her keeper. A darkey was asked once if he could have three wishes granted what they would be and without hesitation he said: "He would take first 10 barrels of whiskey, then he would take 10 boxes of tobacco, and then he hesitated for sometime and said, I believe I would take another barrel of whiskey." If I could have three wishes granted, in the interest of Illinois, I would make my first choice a dairy herd for each farm in the state, my second choice a silo for each herd and my third choice a few more cows. I acknowledge as an additional cause for embarrassment today the personnel of this audience who demand a reason for the faith that is within them and I realize that the influence of your verdict will be felt far beyond the confines of these walls and the ultimate decision of a question more important to this state than we can conceive will be materially affected by this verdict. If any further evidence of my position on the question of the dairy cow for Illinois is needed, I would say that I believe a failure to encourage the most generous introduction of dairy cows into this state is absolutely criminal and that any citizen of this great commonwealth to whom has been given a position of trust that in any

way discourages the development of dairying to the highest degree should be punished by eternal ostracism from the arena of politics, for my opinion today is exactly opposite to that of the boy who was one of a family of ten children and who was called into his mother's room one morning to welcome the advent of the eleventh. He looked at the little fellow intently and with a serious expression for a while, when his father said, "What do you think of it?" He answered, "Well, I can think of a good many things we need worse." I am honest when I tell you I can think of nothing Illinois needs worse than the dairy cow.

Kentucky boasts of its beautiful women, fast horses, good whiskey and a legion of colonels; Missouri and Iowa of corn and beef cattle; Kansas and Nebraska are noted for alfalfa and wind, and Colorado for cantaloupes and Socialists. California and Florida's greatest claim is orange groves, lemon orchards and salubrious climate, and Washington heralds to the world its greatest attractions, potatoes and prunes. Minnesota raises its voice as pre-eminent for wheat, and Georgia, the Carolinas and Texas swell with pride because of their cotton. Mississippi raises cane; while Louisiana's prominent crop is rice. Ohio is arrogant over its crop of presidential timber, and Virginia and Tennessee because of their cigar wrappers and high grade chewing tobacco. Vermont's claim to a place on the map is pumpkin pies and maple syrup. Pennsylvania became notorious through her coal fields and New York for the production of apples, hops, cream separators and United States senators. Rhode Island crows over its greatest industry, poultry raising and Connecticut has a copyright on wooden nutmegs. New Jersey's banner crop is watermelons and mosquitos while Maryland's pride is oysters and peaches. Massachusetts is the home of cotton mills and culture, and Arkansas of tall timber and travelers. Indiana is famous for hoopoles and poets and Wisconsin for cranberries and beer. Michigan for grapes and salt; Maine builds ships and harbors them on the coast that made it famous. Delaware abounds in sweet potatoes and fish, while New Hampshire comes to the front with isinglass and soapstone. We think of all these

and in addition are reminded of Alabama's negroes and mules, and Dakota's wheat fields and cyclones and Idaho's copper and Oregon's salmon and sheep and Montana's mines, and when we are reminded that of all the states, Illinois stands pre-eminent for her packing interests, her large cities, her beef and hog products, when we remember our world-wide reputation because of the enterprise manifested in the Columbian Exposition is it any wonder that Illinoisans are proud of the state that is an empire within itself? And yet with all our boasted wealth and natural resources, I would have the dairy cow the most prominent cause of Illinois's fame.

I am not here today to introduce the dairy cow to Illinois and Illinois people, for she is no stranger to this great state, but I come to you with a message of interest in her behalf because of what she has done and because of the rich promises she makes. I come to protest against unfair discrimination in favor of her brother and to demand recognition that will enable her to fulfill her promises and her keeper to reap his reward. I look forward to the time when her advocates, who have for years defended her and sung her praises, will be made to feel like the boy who in saying his prayers always prayed to God bless Aunt Harriet and make her happy. One night his father was listening to him and he heard him pray for everybody but her. He said to him, "You forgot to pray for Aunt Harriet." The boy said, "She don't need praying for any more; she is engaged now." When Illinois as a unit has become engaged in dairying, then will the dairy cow's entry into good society be made easy and her influence courted by the office-seeker and her rights protected by the officeholder. I am impressed that some of the characteristics of the dairy cow are modesty, fidelity, patience, constancy and industry and for these qualities she commands our admiration and is entitled to our most generous consideration. It is interesting to note her prominence in making history and the absence of any mention of her in recording that history. It is seldom she gets her picture on the front page of a newspaper. Mark Twain said once about the Platte river, that it was a mile wide and an inch

deep—a stream of wide circulation and but little influence. While the dairy cow has been regarded as indispensable on every farm and her product a necessity in every family, my observation has been that as a rule she has had seemingly but little influence in the social, commercial and political field. The agricultural press devotes about half its space to corn and wheat, half of the remainder to cattle, horses, hogs and sheep and the rest to advertising, except one or two columns devoted to the performance of a record-breaking cow or the failure of a scrub herd, that was half fed and had no care. Something over thirty years ago a dairy cow got some notoriety and her picture in the leading periodicals of the United States by kicking over a kerosene lamp and starting a fire that cleared off a patch of ground preparatory to the building of the greatest city of modern times, one that is commensurate with the demands of a great and growing country, thereby making herself a benefactor, instead of the instigator of a calamity. It has not been long since she succeeded in getting her picture into one of the leading magazines because of a successful campaign conducted by her personally in favor of Peter Porter of Niagara Falls for congress against the old time and popular politician, James Wadsworth. A few days since I had my attention called to the election of a Republican in a Democratic county in Iowa through the influence of the dairy cow and it has been intimated that she had something to do with the Democratic victory in Nebraska in the last campaign and the information comes to me that Missouri has awakened to the necessity of importing a few good Democratic dairy cows into the state before the next election. If there are those here to whom her influence as a politician appeals, I can recommend her to your careful consideration. I believe under proper care and favorable conditions she would present a deadlock in the legislature and I know that she would forever remove the necessity for sending troops to our capital. I appreciate there may be some here whose interests are varied, and even those who are prejudiced against dairying, and in view of this I realize fully the responsibility of introducing and chaperoning this member of the world's animal

aristocracy, and yet I say to you, in all seriousness, that it gives me a great pleasure to present today the undisputed claim this noble animal has on each one of you.

Her position might be illustrated by the story of the Irishman in New York who had imbibed too freely of his favorite beverage and when he got on an elevated train in the evening to go to his home, he was barely able to navigate. He found the car crowded, so he took hold of a strap to support himself, and was swinging back and forth when he noticed in front of him a distinguished looking gentleman with a plug hat apparently very much interested in a newspaper he was reading, and alongside of him was a cage containing a monkey. After taking in the situation he addressed the man and referring to the monkey, he said, "Has that gentleman paid his fare?" The man paid no attention to him and he repeated, "Has that gentleman paid his fare?" Then the man gave evidence of being annoyed, jerked the cage up and set it on the floor, leaving the seat vacant, and the Irishman swung into it. His head soon drooped and he began to doze. Finally the car made a sudden stop and woke him up and he looked at the monkey a little while, then turned to the man with the silk hat and said, "What is the nationality of that gentleman?" The man thought he saw a good chance to crush the Irishman and he said, "Part Irish and part monkey." But the man who belonged to a people that are never lost for repartee said, "He's kin to both of us, ain't he?" So it can be said of the dairy cow's relation to the dairyman and the beef man. She is a kin to both of them. She is more than this; she is a kin to every phase of the commercial, industrial and social interests of this great state.

Two weeks ago I attended at Columbia, Missouri, many of the exercises incident to Farmers' week. This is an annual event and all of the different agricultural interests are represented, and at this time the different organizations and associations held their meetings. There was an elaborate program in each department. On the front cover of the general program that was sent out there was the picture of a handsome team of mules and under-

neath these mules was written, "Missouri stands at the Head, the only safe place."

I would that I might today paint another picture that you could take home with you and preserve on the tablet of memory. It would be the picture of a dairy cow and underneath would be written "Illinois stands at the other end, the only harbor of safety from financial panics and crop failure and industrial paralysis and commercial depression."

I am not here today to discuss the dairy cow from a scientific standpoint. I haven't the time and this is not the place, and further than this, I confess my knowledge of her from this point of view, as compared with eminent authorities who are here for that purpose and who you will hear during the week as something like that of one of the boys in a large Sunday school class, who was being examined one day on prominent incidents recorded in the Bible. The teacher pointed her finger at the little fellow and said, "Jimmie, you tell me who killed Cain." He said, "Teacher, you needn't ask me; I didn't know he was dead." I know her having a long uninterrupted history of usefulness. I am not here to discuss her ancestry, because her influence and usefulness cannot be estimated by this. Neither do I ask for her a place in the deliberations of your councils on the basis of what is to be accomplished by her posterity, but I present her not alone for what she has done, but for what she is doing now and what she stands ready always to do.

It would seem impertinent almost for me to attempt to give this intelligent and well informed audience the definition of a dairy cow and yet, I apprehend if each of you were asked to give one, there would be a marked variance in the answers, for I am convinced that to an extent we each make our own dictionary. A man goes into a blacksmith shop, picks up a piece of iron and drops it without being told. The blacksmith asks him, "What's the matter," and he says, "It's hot." He says, "No, that isn't hot," and he picks it up and handles it without inconvenience. Their definition of hot is not the same. The man who offers to help his wife wash the dishes, sticks his hands into the water

and jerks them out and yells and says something he wouldn't want his children to hear and his wife calls him a baby and puts her hands in and says, "That isn't hot." Again, there is a difference in the meaning of hot. If I was to ask each man here today for his definition of a beautiful woman—one would have her a blonde, one a brunette, one tall, another short, one large, another small. If you are a married man, your idea of a beautiful woman would be in harmony with the type of woman your wife is. If you are not married, your sweetheart would be your ideal.

If I was to ask 100 women for the definition of a handsome man, I apprehend I would have 100 varieties. Some would have black hair, some light, some gray and some red. Some would have a full beard, some a mustache, some a goatee, some sideburns and some smooth faced. They would be tall, short, light, heavy and a varied assortment.

All horses are flesh and blood; they all have legs and tails and ears and eyes and hair, and yet thinking of a horse we associate ideas that are at wide variance. One man may think of him as a heavy built draft horse, another of a driving horse, another of a race horse and each wonders what in the world the others can see in their favorite horses that is the least bit attractive. In fact, over where I was raised in Missouri there are a great many people who could never see any beauty in a horse because of his short ears. The different hog fanciers and breeders, as well as the feeders, associated with the word hog just such an animal as he has chosen for his breed, or such an animal as he has been impressed with through somebody else's experience. One man's hog is black, one spotted, one white, one red, etc. The shape and form of these hogs differ, as well as their color. I am told that in Georgia the only hog that is attractive is one that is built for speed so that he can keep out of the way of a dog and a nigger. This same principle might be illustrated by a similar reference to everything, and among the many animals that are the subject of discussion at this convention, there is probably none that present so many types in accordance with

the different ideals as the cow. I admit that to the cattle man and to the casual observer the dairy cow is the least attractive and yet to that man of Milwaukee, whose cow produced 1,000 pounds of butter in a year, a Guernsey cow is the most beautiful animal in the world. To the man in Holland, whose cow produced 1,100 pounds of butter in a year, and W. F. Gillette, whose Colantha produced nearly 1,200 pounds in a year, a Holstein is the ideal. Prof. Edkles of Missouri and Mr. Auten of Illinois when thinking of a beautiful cow would see in their mind the picture of a Jersey. Dr. Niles of Lansing, Michigan, would decide on an Ayrshire and to these men these cows, that the beef man would make fun of, with long, thin necks, large paunches, large udders extending well forward, long, high rumps, dish faced, broad loins, lean shoulders, deep chest, large girth, wedge-shape and full bright eyes, are the most beautiful specimens of the animal creation. It has been said of Bostonians that if every house in Boston was swept away by a cyclone and there was not a building left anywhere, to them Boston would still be there and the reason is that Boston is a state of mind. We are forced to believe that beauty is strictly a state of mind.

I can presume on the state of mind of many to whom I am talking and in consequence I will not attempt to introduce this noble animal (with all of her excellent traits of character and acknowledged usefulness) on the basis of beauty. While I will reserve the right to exhibit her in the sweepstakes ring, for the present I will enter her in a different class and in this class I am sure she will appeal to the beef man and the horse man and the hog man and the sheep man and the mule man and every man as being meritorious in the highest degree. To illustrate in the most forcible manner I will relate a circumstance that occurred in Ohio. A young man was making frequent visits at a house where there were two daughters. One was a very beautiful girl, but had no accomplishments; the other was exceedingly homely, but a beautiful singer. Each was attractive to him, one because of her appearance, the other because of her talent. In his contemplation of marriage, it was difficult for him to decide as be-



tween these two most estimable young ladies. Under the captivating influence of the enchanting music of the one who could sing, he finally decided in her favor, proposed to her, was accepted and they were married. A short time after they were married, he woke up one morning and while his wife was still asleep, he studied her features and her face was positively painful. When he remembered her beautiful sister, as well as many other acquaintances, she suffered from comparison. When he was just about ready to decide that it was more than he could bear, he was reminded of the accomplishment that had been so attractive to him and he laid his hand on her shoulder and gave her a shake and said, "My God, Maggie, get up and sing."

If you think her homely, I ask you today to remember the most beautiful song that Illinois ever heard as she came at eventide from across the prairie and the winding paths of the forest along the banks of the historic creek swinging her head with the proud air of a prima donna and chanting in low, solemn tones an anthem of hope to Illinois' mothers and Illinois' children and keeping time to the music of a silver dollar at the rate of 16 to 1 as they dropped into the banks of Missouri to be drawn on as necessary to supply the wants of a people over whose destinies she seemed to have such wonderful control.

Is beauty the only standard by which you are governed in your consideration of friends? I answer, no! Do you know of anyone whom you regarded at first sight as being so homely your sympathies were aroused and when you knew them better, they seemed to get better looking until you couldn't detect anything homely about them? We have an old horse at our house and if you will promise not to tell, I will confess to you he hasn't a beauty spot on him and yet when my wife takes the children and drives down the lake front she compares Old Tom with every horse she meets and her universal verdict is that for actual beauty Tom beats them all. I tell you, beauty is a state of mind and in any event there is something more substantial that appeals to our better nature. Usefulness is prominent over all other attributes. Individuality is what we are impressed with. Ben

Butler was a prominent factor in American politics and American history and yet I think you will agree with me that he would have had no chance to capture the prize at a beauty show.

Abraham Lincoln was a statesman, whose equal we have no knowledge of. He was a general such as the world never knew. The whole nation knew him to love him and yet he could doubtless have emptied a house or dismissed an audience of his most loyal admirers in three minutes had he attempted to sing a solo.

Henry Grady of Atlanta electrified and held spell-bound his hearers when he made that memorable speech at the banquet in Boston, the influence of which hastened the reuniting of a divided people and made us a unit with one government and one flag, and yet had he prepared with his own hands that banquet, I doubt not he would have been in no condition to talk and the rest would have been too sick to hear.

Jenny Lind electrified the people of two continents with her wonderful voice and I would not forget that she got her inspiration from the vast audiences that greeted her everywhere and people who couldn't sing a bit.

We think of George Washington, of Lincoln, of McKinley, of Grant and Sherman, and Sheridan and Lee, of Patrick Henry and Webster and Blackstone and Blaine and Ingalls, of Beecher and Talmage and Moody and Sam Jones, of Booth and Barrett and Denman Thompson and Joe Jefferson and Mary Anderson and Lottie and Sarah Bernhard and Lillie Langtry, of Madame Calve and Melba and Patti and Jenny Lind, of Child and Carnegie and Astor and Tilden, of Hill and Harriman and Gould and Vanderbilt and Rockefeller, of Roosevelt and Hughes and Folk and Bryan and thousands of others in the industrial, political, social, religious and commercial world, and after we have enumerated all of the historians and educators and lawyers and merchants and philanthropists and railroad magnates and congressmen and senators and representatives in every walk of life, I want to say in all seriousness that there is not a single one of them who is more important or more necessary in harmonizing

the interests of this world than retiring, modest, pure, Christian mother who raised a family of children in a log-house in the Red Haw district of Illinois, or the good, true, indulgent, loyal husband and father who in the obscurity of his surroundings protected that family, provided for their comfort and assisted in making that home, though ever so humble, the most sacred place on earth and a monument to the highest type of civilization, a true American home.

At the end of the bridge across the river at Saginaw, Mich., there is a small saloon and written in great big letters are these words, "Welcome to all Nations, except Carrie." It is not often the exceptions are named and oftentimes it is difficult to tell who they are.

Now, in discussing the claim of the dairy cow, let us decide whether she has any pull or not to make her welcome. Some of you may say, who is she, what claim has she on our time, what influence has she, what good can she do us? Listen, are you a politician? She controls more votes than any other industry represented in this convention. Are you a banker? She deposited more money in the banks of our country last year than came from any other source. Are you a merchant? She bought and paid cash for more merchandise last year than any other item of agriculture. Are you a stock raiser? She is stock. Hon. F. D. Coburn says, "She is the steer's mama. She is the steer's sister. Her product is the foundation of a good hog." Are you a farmer? Exclusive of stock raising as a specialty, she has made more good farms out of poor ones than all the other influences combined. She has changed more six-bushel wheat land and 15 bushel corn land to 25 bushels of wheat and 75 bushels of corn to the acre than all of the combined effort of modern science.

It seems to me that above all professions the farmer's has had the most pronounced recognition. Did you ever stop to think that the first farmer was Adam? Did you ever think that when God Almighty himself made this wonderful world, when he created this wonderful habitation of ours, when he had com-

pleted it and pronounced it perfect, when he had finished this universe with its majestic mountains, its extensive plains, its towering trees, its rippling brooks, its noisy rivers, its placid lakes, its rough oceans, its dense forests, its innocent flowers, this beautiful piece of architecture and workmanship, over which the inhabitants of the globe have gone into ecstasy for over 6,000 years and have continually found something new to admire, when after this thousands of living creatures were created, when finally the climax was reached in the creation of man in God's own image, a perfect creature, that man was a farmer and placed on a farm.

This is not all. Do you remember years after this, when God desired to recognize his children in a substantial manner for their obedience, or when he made them a promise of a rich reward for fidelity and compliance with his requests, in his desire to make this gift valuable, did he offer corner lots in some city, bank stock, mines of rich mineral, blocks of fine houses, droves of horses or beef cattle? No, he offered them farms. That was the most valuable heritage he could give them, and I want to call your attention farther to the fact that he made this proposition just as attractive as possible by not only promising farms, but promising dairy farms—a land of milk and honey.

In conclusion, I would leave these thoughts with you today as reasons why the dairy cow should be most liberally introduced into Illinois and at all times be the object of special care and consideration. She is entitled to this consideration because of her long years of usefulness. She is worthy of it because of her money making power and by no means least in my estimation is her influence on the home. Prof. Erf of Ohio says he found in that portion of Europe where the most cows were milked, not only the best farms and the highest priced land, but he found a higher order of intelligence and more refinement. I believe that a man is made better for associating with a good dairy cow.

Ladies, if any of you have a man in your family who has an ugly disposition and hard to manage, I beseech you to get him into the dairy business as soon as possible. A cow is an advo-

cate of temperance; she won't do business with a man who drinks to excess. If a man persists in swearing and talking loud, or gives way to his temper around where she is, she shuts off his supply. A moderate cussing and a lick with a milk stool will tie up her milk duct in a knot and it's a case of visiting the iniquities of the father on the children, because they have to go hungry on account of their father's iniquitous conduct towards the cow. A man soon learns to quit hitting the cow or swearing at her because it costs too much. They soon begin to feel like Bob Evans did when one Sunday in a strange city he went to a very fashionable church and was shown a good seat that was unoccupied, and after a little while a very elegantly dressed couple came down the aisle and stopped at this seat and looked a little disgusted, but went in and sat down. The man evinced considerable annoyance and finally handed a card to Colonel Evans on which he had written, "This seat costs me \$2,500.00 a year." Colonel Bob handed it back to him, after writing on the other side, "It costs you too damn much." I commend this wonderful animal to you for her intrinsic worth. For thousands of years she has furnished a table delicacy that is not only desirable but a necessity. This animal that by the Hindoos is worshipped, that is regarded by them as having no superior, that is represented as stairs that lead to heaven and that are adored in heaven; this noble, silent partner of ours, man's best friend and to whom we owe the most, the source from which we get a large proportion of every meal. When we awake we behold the walls on which the plaster has been held by her hair, we fasten our clothes with buttons and we comb our hair with a comb made from her horns. We put on our feet a pair of shoes made from her skin and as we enter the dining room and sit down to a tempting breakfast we find she has provided us with a piece of cheese, a cup of milk, a pitcher of cream for our coffee, a plate of hot cream biscuits, a dish of butter, a smoking beefsteak, and above everything else are the bright, interesting, idolized children, whose foster mother she is. We go to our office and fasten together important documents with glue made from her hoofs

and when we go to dinner we enjoy from her bountiful provision soup made from her tail; elegant roast beef, pumpkin pie made with her milk out of pumpkins grown on land fertilized with her bones and we eat it with teeth that through a chemical process has been made from her paunch.

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### THE RESOLUTIONS.

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By the President :—We will now listen to the Resolution Committee :

Whereas, At a recent meeting of your advisory committee of the state experiment station, they selected Mr. L. N. Wiggins of Springfield, to represent this association on the general legislative committee for the station; therefore, be it

Resolved, That we approve such selection.

Resolved, That as the question of tuberculosis in the dairy herds of this state is the most important question before us today, we approve the idea of taking up this question with other cattle associations, and our experiment station, in a safe and sane way, believing some way will be found that will be safe and still be satisfactory to us.

Resolved, That we recommend that this association approve L. N. Wiggins of Springfield to act for us with and on a committee from the several associations and experimental stations, with full power to act for us on this question; but we stand for, and wish to go on record, as an association for the following :

That they appeal to the legislature to approve an act which shall afford relief to the breeders and owners of cattle, whose animals may be affected with tuberculosis, an act to contain the following :

First—That a committee of three be appointed to appraise the animals, one of said committee to be appointed by the state board of live stock, one by the owner of the cattle and they to choose a referee.

Second—The expense of such committee to be borne by the state, and such disposition made of the cattle so affected as the state veterinary shall deem proper and just.

Third—That the state pay for all slaughtered cattle at the appraised value to the owner thereof, within thirty days after slaughter.

Resolved, That when the advisory committee is approved, they be instructed to vote and work for more men in the field, both farm and creamery, and also to advise that after the creamery at the state experimental station has received sufficient milk and cream for instruction work and experimental purposes, the price paid to patrons should not be more than is justified for commercial purposes.

Whereas, The assistant pure food commissioner, Mr. H. E. Schuknecht, is to leave his office, and

Whereas, The dairy interests have recommended Mr. John B. Newman of Elgin, and as Governor Deneen has the same under consideration; therefore, be it

Resolved, That we, the Illinois State Dairymen's Association, in convention assembled, hereby approve and urge his appointment as a man well qualified for the position.

Resolved, That the thanks of this association be, and hereby are, extended to the state board of agriculture for placing the dairy building at the state fair in charge of Mr. A. O. Auten, who has always worked with our association for the best interests of dairying at the state fair.

Resolved, That of the twelve pure food inspectors allowed by the law, not less than four of them should be practical dairymen, or at least have a general knowledge of dairying.

Whereas, It is already certain that an effort is to be made in congress, either at this or the next session, to repeal or modify the national oleomargarine law that has been the only protection

of the dairy interests against substitutes for dairy products. Also that the grocers' and butchers' associations as directed by its members in large cities, is endeavoring to commit their organization as an opponent of the oleomargarine law; therefore, be it

Resolved, That we urge dairymen to work with their home merchants to prevent them from being led into opposition to the dairy interest by the city dealers; that we urge dairymen to present the need of continued protection of the dairy interest to their congress; and that we as dairymen support the National Dairy Union, an organization formed to secure dairy legislation.

Resolved, That we urge our legislative committee to do all in their power to secure the appropriation for the experiment station as formulated in the general bill, especially for that portion pertaining to the dairy section; also recommend they ask and urge the legislature to allow this association the same amount as allowed for the past two years, believing this amount is as small as this association can do effective work with, and continue the educational work outlined for the future.

Resolved, That in view of the great economic value of our birds, especially the quail, to the fruit grower and farmer, that we, as a society and as individuals, will do all within our power for their preservation, and urge that our legislature protect the quail by more stringent laws, and remove it from the list of game birds that may be killed for a period of at least ten years.

Resolved, That our thanks are again offered to our friend, Jules Lombard, for his presence and great help to make our "annual" the success it has been, and heartily recommend our directors to acknowledge his help in a more substantial manner.

Resolved, That the thanks of this association be, and hereby are, extended to Mayor Edmonson, E. Sudendorf, the merchants and citizens of Clinton and DeWitt county for making this, the thirty-fifth annual meeting of our association the success it has proven; to the press of the state and city for help; to the speakers and officers, for the time and leadership they have given, in assisting and guiding our association so that it stands today for



the best and highest education of the dairymen of Illinois, and is so recognized.

Mr. Jos. Newman:—I move the adoption of the resolutions as read.

President:—Signifying by saying “Aye.”

Carried. Adopted as read.

Mr. Schuknecht, Chairman of Nominating Committee, reported as follows:

For President: L. N. Wiggins, of Springfield.

Vice President: J. P. Mason, of Elgin.

Directors: J. P. Mason, L. N. Wiggins, Chas. Gilkerson, of Marengo; E. Sudendorf, of Clinton; Carl E. Lee, of Urbana; A. F. Jensen, of Effingham, and J. F. Sanmann, of Havana.

Advisory Committee: L. N. Wiggins, Joseph Newman, of Elgin; M. S. Campbell, of Genoa; J. P. Mason and Mr. Latzer, of Highland.

By the President:—What is your pleasure? All in favor of this adoption, please rise.

Mr. Newman:—I move the secretary cast the ballot.

Carried. The secretary announced the vote cast and the president declared the result.

Mr. Wiggins:—I thank you for the honor. I had rather hoped some one else would shoulder the burden. The officers and directors of this association must be supported by the full association. We have a great many important questions to take up this winter and next year. Don't forget that it is your interests we are after. There are no salaries connected with this association. It is all for the good of the cause, and we are work-

ing for you, as well as for the entire dairy industry. Any time you have any suggestions or questions you would like to have taken up, if you will write to your director or secretary, we will be very glad to take them up in the proper way, and don't overlook the fact that the legislature is in session. I think we had better adjourn.

Mr. Caven:—These scores have been delayed and would not take but a moment. Scores 90 and above I will read, and the winners in other contests.

The butter was scored by three judges, each acting separately. They did not compare their scores and the scoring, as announced, is the average of the markings of the three judges

	Average score three judges.
Wm. Bramstadt, Mascoutah .....	90 2-3
M. L. Muselman, Lanark .....	92 2-3
A. D. McCready, Argyle .....	93
J. F. Westphall, Greenwood .....	91 9
H. Jacobson, Nokomis .....	93½
Robt. Moren, Morrison .....	92 1-3
Wm. Englebrecht, Fairhaven .....	93
Louis Nelson, Camp Point .....	92½
Harry S. Hague, German Valley .....	90
Ferdinand Grimm, Chadwick .....	94½
N. A. Peterson, Sigel .....	91 1-3
Geo. Aler, Rockefeller .....	91 1-3
Fred J. Weddige, Big Rock .....	91¼
Frank Johnson, Prophetstown .....	90
W. H. Welch, Flora .....	91
S. L. Murphy, Garden Plain .....	92 1-3
D. C. Benton, Kaneville .....	93
B. K. Peter, Dallas City .....	93 2-3
Geo. Simonson, Urbana .....	94
Geo. Bloyer, Harper .....	93½
H. R. Duel, Savana .....	91 1-3
Chas. Foss, Cedarville .....	91

Milk Testing—H. D. Remington, Clinton, first; B. K. Peter, Dallas City, second; N. A. Peterson, Sigel, third; Carl Lind, Urbana, fourth.

Butter Judging—Chas. Foss, Cedarville, first; Carl Lind, Urbana, second; S. L. Murphy, Garden Plain, third; B. K. Peter, Dallas City, fourth.

In conducting the butter judging, the three judges decided on the score of 10 tubs, and the men entered in this contest scored the same 10 tubs. Mr. Foss was nearest to the three official judges.

Milk contest is not quite decided. So far we have failed to receive from the University the bacteriological result. The report was expected on the first train this morning. If we do not get it in time, we will have to announce it by letter.

By the President:—The number of entries was very good for this part of the state.

Adjourned until 1:30 p. m.

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**Thursday Afternoon, January 21, 1909.**

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**ADDRESS**

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**By**

**Prof. Eckels, University of Missouri**

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**Dairy Husbandry.**

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**Feeding the Dairy Cow.**

By the President:—I wish to introduce Professor Eckels of the University of Missouri, who will talk to us on Dairy Husbandry.

There are two factors which largely control the economical production of milk. One is the adaptability of the cow used to this purpose and depends upon her individual and breed characteristics. The other is the amount and kind of food eaten. The problem confronting the dairyman is the production of the largest amount of milk and butter at the least expense. In order that this may be realized, both the important factors mentioned must receive careful attention.

In most cases the largest direct expense is for feed. Every one familiar with the prevailing conditions knows a large amount of feed is used without producing the returns it should. It would be safe to say that the average yearly milk production per cow could be increased by one-half or three-fourths by following better methods of feeding.

It is not the intention at this time to give results of new experimental work, nor to lay down fixed rules for feeding, but to make some suggestions for practical feeding, these suggestions being based on the facts developed by the practice of the best dairymen and by scientific experiments.

Turning on Pasture in Spring—Every owner of a cow welcomes the time when the animal can be turned out to pasture. Not only is the labor and expense connected with winter feeding done away with, but each cow is expected to give the best results of the year on grass. In changing from dry feed to grass, it is best to go somewhat slowly, especially with heavy milking cows. The young, immature grass, such as we have in early spring, contains a large amount of water and a small amount of dry matter, and it is almost impossible for a heavy milking cow to eat enough of such feed to supply the necessary amount of nutriment. Wheat and rye pastures are of the same nature. Another reason for putting cattle on pasture gradually, rather than suddenly, is the effect on the taste of the milk. When a cow is changed at once from a grain ration to grass a very marked taste is developed in the milk, while if this change in feed is made gradually and not suddenly the change in the taste of the milk is scarcely noticed.

Summer Conditions to Be Maintained as Near as Possible Throughout the Year.—Soon after the cows are on pasture, usually the latter part of May or the first part of June, they reach the maximum production of milk for the year. This suggests that what the dairymen must do in order that the production of milk may be largest, is to imitate these summer conditions as far as possible throughout the remainder of the year. This is what the careful dairyman and skilled feeder does, and the results correspond closely to the success with which these summer conditions are maintained. The summer conditions which bring about the maximum production and which are to be maintained as far as possible throughout the year, are described in the following tement :

1. An abundance of palatable food.
2. A balanced ration.
3. Succulent feed.
4. Moderate temperature.
5. Comfortable surroundings.

How these conditions may be maintained will be discussed in detail farther on.

Grain Feeding While on Pasture.—There is some difference of opinion on this question from the standpoint of economy. There is no question but that a cow will produce milk if fed grain while on pasture, and if a large yield is of more importance than economy of production, grain should certainly be fed. The cow that gives a small average quantity of milk will not produce but very little more, if fed grain while on pasture. However, with the heavy producing cow the case is quite different and it is necessary that she be fed grain or she will not continue on the high level of production for a very long time. The necessity for feeding grain to the high producing cow arises from the fact she cannot secure a sufficient amount of nutriments from the grass alone and must have some concentrated feed in the form of grain in order to continue to produce large quantities of milk.

Experiments made by the Cornell Experimental Station, covering four years, showed that while an increase of milk yield was secured from grain feeding, it was not economical to produce it in this way. They secured only about an additional pound of milk for each pound of grain fed. In these experiments the pastures produced an abundance of nutritious grasses. They observed, however, that the cows fed grain during the summer gave better results after the grazing was over than those not having received grain. This is also a matter of common observation and should be taken into account in considering the advisability of feeding grain. The point is that the cows fed grain stored a considerable quantity of surplus nutriments on their body which were afterwards available for production of milk. Where a small amount of grain is fed, corn is as well adapted as anything else, where it is cheaper than other feeds, since on account of the comparative narrow nutritive value of the grass the corn does not unbalance the ration. However, in case of feeding in large quantities of grain, as would be necessary in the case of cows producing from  $1\frac{1}{2}$  to 2 pounds of fat per day or more, other

feed containing more protein should be used in part, such as bran, gluten meal, oats or cottonseed meal.

Providing for Periods of Short Pasture.—As long as fresh pasture grasses are abundant, the ordinary cow is about as well provided for as she can be to produce milk economically. Unfortunately the season of abundant pasturage is often short. In many localities, a dry period, often of several weeks, occurs during the middle or latter part of the summer and the pastures become short and is insufficient to maintain a full flow of milk. This season is often the critical time of the year for the dairy cow. It is probable that as much loss occurs one year with another by lack of feed at this time as occurs from improper feeding during the winter season. When the season of dry feeding arrives, the farmer expects to feed his stock and is prepared for it. On the other hand, as long as the cattle are on the pasture and the field work is pressing, the tendency is to let the cows get along the best way they can.

Under average farm conditions in the West, cows are fresh in the spring, give a good flow of milk while the pastures are good, but when hot weather and short pastures come, the flow drops one-half or two-thirds, and the cows are almost dry at the beginning of winter. It is almost impossible to restore the flow of milk to the original amount after it is once allowed to run down from lack of feed. To make large returns from the cow, a large yearly production must be had, and to do this, the flow of milk must be kept up ten or eleven months in the year.

Summer Soiling Crops—Where the farmer can grow alfalfa and corn, there is no reason for allowing the cows to suffer for feed during this period of short pasture. Green alfalfa is the best summer soiling crop that can be grown. The only thing that is better might be a combination with green corn. These two fit together especially well. Under most conditions the most difficult season of the year to get green crops available for feeding supplementary to pastures, is in the earlier part of the summer before corn is mature. Alfalfa is at its best during this season and serves the purpose remarkably well. In the latter part of

the summer when corn is more mature, there is nothing better than green corn. No plant now known to us equals corn in its adaptability to the soiling system. Corn has the advantage of yielding larger quantity of digestible nutrients per acre at less cost than any other crop suited to soiling. Where alfalfa is not grown, the use of the corn silage for summer feeding is bound to be practiced extensively in the future. We are coming to depend more and more upon silage as a supplementary to pastures throughout the season. The use of silage for this purpose allows the corn to be mature to the proper stage before being harvested, giving a maximum yield of nutrients per acre and is more economical of labor as compared with hauling green corn from the field since the cutting and hauling corn for the silo is all done at once. In planning silos, it is a good plan to build one designed especially for winter feeding and without danger of too much silage being spoiled.

Next to corn and alfalfa should probably be placed sorghum as a soiling crop. The yield per acre of green sorghum is very large and it serves much the same purpose as green corn.

Winter Feeding—Fortunately, the period of winter feeding in this latitude is shorter than in most of the dairy States. By pasturing wheat and having a blue grass pasture which has not been eaten down, to turn into late in the fall, the pasturing season can be greatly prolonged. The great problem in winter feeding, as already stated, is in general, to maintain summer conditions. It is entirely feasible to maintain practically these summer conditions throughout the entire winter on any farm when the subject is properly understood and the necessary arrangements made. In order to point out how these summer conditions may best be maintained during the winter, statements already given will be discussed in detail.

Amount of Feed—The first condition given as typical of the summer feeding is an abundance of palatable food, and on this point is made one of the most common mistakes in feeding cows. In producing milk, the cow may be looked upon in a way as a milk producing machine which we supply with a certain



amount of raw material in the form of feed, and this raw material is manufactured into milk. The same rule holds in running the milk manufacturing plant as would hold in running any other manufacturing plant; it is run most economically near its full capacity. Every one who feeds animals should thoroughly comprehend that, first of all, the animal must use a certain proportion of its food to maintain the body. This is the first requirement of the animal and it is the first use to which it puts its food. This we call the ration of maintenance, and it is practically a fixed charge. This is, it is practically the same whether the animal is being utilized for maximum production, or if the animal is being merely kept without producing any milk at all.

In the case of an ordinary dairy cow, this ration of maintenance amounts to about 60 per cent of the ration that she is given. In the case of a heavier producing animal, for example, one producing 1 pound to  $1\frac{3}{4}$  pounds butter fat per day, this ration of maintenance amounts to about one-half the total feed of the animal. It should be clear that, after going to the expense of giving the animal the necessary amount to keep her alive, it is the poorest economy to refuse to furnish the other 40 or 50 per cent which she would utilize exclusively for milk production. On the average farm this is one of the most common mistakes made. The importance of liberal feeding for economical production can be easily understood from the illustration on next page.

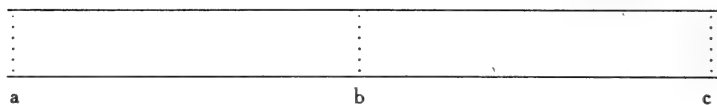
The first illustrates the proper feeding of a heavy producing cow, which is the one usually underfed. The line a—c represents the total capacity of the animal for food, or a full ration. The first half from a to b represents the amount of food required to maintain the animal's body, or the ration of maintenance. The second half, that portion from b to c, represents the proportion of the food used for the production of milk. In this case there is no fat being produced on the animal's body and the cow is supposed to be of such dairy quality that all the feed she can eat in excess of that required for maintenance is used for milk production.

The line below represents what would happen if the feed of

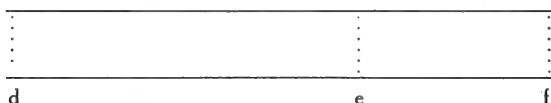
**Cows of High Production Capacity Liable to Be Underfed.****Full Ration.**

Ration of Maintenance.

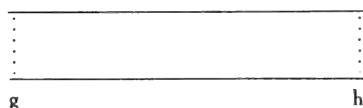
Used for Milk Production.

**Ration of Maintenance Used for Milk Production:****Three-Quarters Ration.**

Ration of Maintenance.

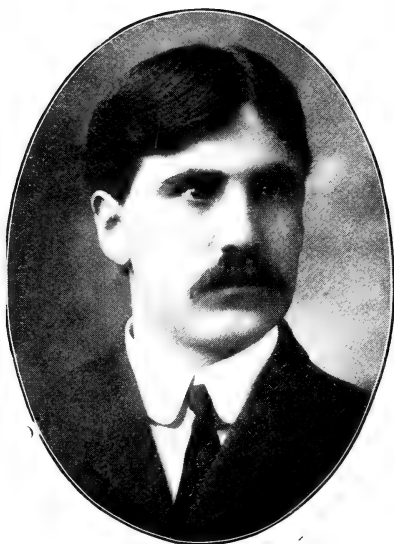
Available for Milk  
Production.**Ration of Maintenance. Available for Milk Production:****Half Ration.**

Ration of Maintenance.



this animal is reduced one-fourth. The ration of maintenance remains practically the same as in the first case. The amount represented by the line d to e is the amount required to maintain the animal's body, which is the same as in the first case. However, the cut of one-fourth in the ration will be seen to come entirely on that available for milk production and reduces that amount one-half.

Suppose the ration of such cow be still further reduced to one-half of the full ration, or that required for maintenance alone, as represented by the third line. In this case the cutting down of the ration one-half would remove all available feed for milk



C. H. ECKLES,  
University Columbia, Mo.

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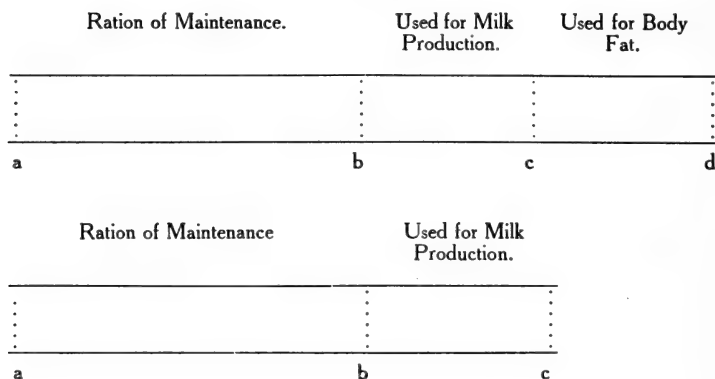
production. However, the animal would not cease producing milk at once. This is a point of great importance in feeding cows, and a lack of such knowledge leads to serious errors in feeding. The milk producing function is so strong that the cow will continue to produce milk for some time, even when the feed is insufficient utilizing the reserve material which has been accumulated in the body in the past. This always happens in the case of a heavy milking cow during the first few weeks after the birth of the calf. At this time, it is not generally possible and not desirable on account of the condition of the animal to feed her a sufficient quantity of feed to supply the nutrients necessary to produce the milk, and even if the feed was offered, the appetite is not usually strong enough to cause the necessary amount of feed to be taken to prevent this loss in weight. As a rule, all heavy milking cows decline in weight for the first two or three weeks, and occasionally for ten weeks, after calving, which means that milk production has been in excess of the feed supplied for that purpose. The same thing happens in the case of the cow that is not fed a sufficient ration for the amount of milk she is producing. She may continue to produce considerable milk for a while by drawing on the reserve material of the body, but as soon as this is exhausted, the production of milk must come down to the amount available for this purpose above the ration of maintenance. When the feed is in excess, the cow begins to store reserve material on her body. If the amount of milk produced by a cow varied directly with the feed, and she did not store up nutrients at one time and draw on reserve material at another, it would simplify the problem of feeding very much and result in more economical feeding at all times.

How to Avoid Over-Feeding.—While the statement and illustration given apply to one class of dairy cows, there is another class to which it does not apply and with which it would lead to a serious mistake in feeding from an economical standpoint. This group includes those of lower productive capacity which are liable to be over-fed, especially when they are in the herds of dairy men, who realize the necessity of liberal feeding. The proper

feeding of this group of animals can perhaps be made clearer by the following illustration:

**Cow of Lower Productive Capacity Liable to Be Overfed.**

**Full Ration.**



The line a to d represents the amount of feed that an animal of this class will consume; a to b represents the ration of maintenance as before. In this case, however, the capacity for milk production is not equal to the capacity of the animal for utilizing feed in excess of that required to maintain the body. The amount which the animal is capable of utilizing for milk production is represented by that portion of the line b to c, while the animal's appetite is equal to the total line ad. This gives a surplus, c to d, which is not utilized for milk production, but which will be used for storing fat on the animal's body, and we will have the cow gaining in weight while she is producing milk. This gain in weight will be of service as far as milk production is concerned, except that it is of some value as a reserve material to be drawn upon at some other time when feed is not supplied in sufficient amounts, but it is not economical nor desirable to fatten dairy animals with the expensive feeds which are fed dairy cows. That portion of the feed represented by the line, cd, should be

taken from the ration. This means reducing her feed to take off the amount used for storing fat on the body; in other words, to feed her only what she will utilize for milk production. This means feeding enough to maintain a practically uniform body weight. In every large herd where the amount fed is not carefully regulated, we find errors made in both classes. We find the heavy producing cows being under-fed, and we find the light producing cows over-fed and allowed to accumulate fat.

Relation of Live Weight to Proper Feeding.—The live weight of a cow is a good index of whether the cow is being fed a proper amount or not, but good judgment must be used in regulating the ration by observing this condition. We must expect that a cow will lose weight in the first few weeks of her milking period, but after this period is past there is no reason why she need change much in weight for several months, and this is the period when the greater part of the milk production is secured. It will not mean of course, that the animal should not be allowed to gain in weight during the latter end of the milking period, as this is necessary on account of the development of the foetus, and since it is natural for the animal to carry some fat on her body at calving time.

It does mean, however, that in order to feed a herd of cows economically it will not do to feed all the same quantity of grain whether they are giving a gallon of milk a day or whether they are giving four gallons, and it means that when a cow in the middle part of her lactation period is putting on weight that she is being fed more than she needs and will give just as much milk if the feed is cut down somewhat. It also means that if a certain animal is losing weight that sufficient feed is not being given, and if the deficiency is not supplied it will not be long before the milk production will come down to correspond with the amount of feed available.

Feeding as Individuals.—In connection with this subject of the amount to feed cows it needs to be pointed out that it is only possible to feed a bunch of cows economically when they are fed as individuals and not as a herd. A too common practice, even

in the otherwise well conducted herds, is for all animals to be fed the same amount of grain regardless of the period of lactation or the quantity of milk individual cows are producing. Such feeding always lacks economy, as the high producing cow does not get enough and while she may milk very well for a short time she soon comes down to a lower level, while the lighter producing cow usually gets too much and accumulates fat.

One of the difficult problems which confronts the practical feeder is how to adjust the quantity of feed to meet these individual requirements. It can be done fairly well even in the large herds by observing how much milk the cow is producing and whether she is gaining or losing in body weight.

Amount of Grain and and Roughness to Feed.—The cow being adapted by nature for consuming bulky feeds does not feel satisfied unless she has sufficient bulk to the ration given at all times. An animal that is fed too much grain in proportion to the amount of roughness may seem hungry, while she really has a sufficient amount of nutrient, but so concentrated that it does not have sufficient bulk. In order to keep the animal filled up at all times and in the natural condition she should be fed practically all the roughness she will eat up clean at all times, and the difference in ration given different animals should be, not in the roughness fed to any great extent, but in the amount of grain.

The following rules regarding the amount to feed cows covers the case fairly well:

1. Feed all the roughness they will eat up clean at all times.
2. Feed one pound of grain per day for each pound of butter fat produced per week, or one pound of grain daily for each three pounds of milk.
3. Feed all the cows will take without gaining in weight.

The rule regarding the amount of grain to feed per day for each cow applies best when based upon the amount of butter fat produced per week, as this makes it applicable to any breed. The



second part of the rule in regard to feeding one pound of grain for three pounds of milk would not work out in all cases, since in a heavy milking Holstein cow this gives a little too large a quantity of grain, and with a Jersey giving very rich milk it is a little too low. It applies best to cows producing milk of about average composition.

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## ILLINOIS DAIRY AND FOOD LAWS.

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An Act to prevent fraud in the sale of dairy products, their imitation or substitutes, to prohibit and prevent the manufacture and sale of unhealthful, adulterated or misbranded food, liquors or dairy products, to provide for the appointment of a State Food Commissioner and his assistants; to define their powers and duties and to repeal all acts relating to the production, manufacture and sale of dairy and food products and liquors in conflict herewith.

Section 1. Be it enacted by the People of the State of Illinois, represented in the General Assembly :

Provision for appointment of a State Food Commissioner and the establishment of a State Food Department. That the Governor shall appoint a commissioner, who shall be known as the State Food Commissioner, who shall be a citizen of the State of Illinois, and who shall hold his office for the term of four years and until his successor is appointed and qualified, and who shall receive a salary of thirty hundred dollars per annum and his necessary expenses incurred by him in the discharge of his official duties, and who shall be charged with the enforcement of all laws that now exist or that hereafter may be enacted in this State regarding the production, manufacture, sale and labeling of food herein defined, and to prosecute or cause to be prosecuted any person, firm or corporation, or agent thereof, engaged in the manufacture or sale of any article manufactured or sold in violation of the provisions of any such law or laws. The Governor shall also appoint from time to time, as required, a Food Standard Commission, for the purpose of determining and adopting standards of quality, purity or strength, for food products, for the State of Illinois, to consist of three members, one of whom shall be the State Food Commissioner or his representative who shall serve without extra pay; one of whom shall

be a representative of the Illinois Food Manufacturing industries and one of whom shall be an expert food chemist of known reputation, all to be citizens of the State of Illinois, who shall receive fifteen dollars (\$15.00) per day for a period not exceeding thirty (30) days in one year and necessary expenses incurred during the time employed in the discharge of their duties: *Provided*, that said Food Standard Commission, in determining and adopting a standard of quality, purity or strength, of milk or cream, shall fix such standard as may be determined solely by the examination and test of milk or cream and the can or receptacle in which it is placed.

The said commissioner is hereby authorized to appoint, with the advice and consent of the Governor, one assistant commissioner, who shall be a practical dairyman, whose salary shall be \$2,000 per annum and expenses incurred in official duties. One chief chemist, who shall be known as State Analyst, whose salary shall be \$2,500 and expenses incurred in the discharge of official duties. One attorney whose salary shall be \$1,800 per annum and expenses incurred in the discharge of official duties. One chief clerk, whose salary shall be \$1,800 per annum and expenses in discharge of official duties. Said commissioner shall also have authority to appoint five analytical chemists, whose salary shall be \$1,200 per annum each; twelve inspectors, whose salary shall be \$1,200 per annum and the necessary expenses incurred in the performance of their duties. Three (3) stenographers at \$900 and one assistant clerk at \$900 each.

The said commissioner shall make annual reports to the Governor not later than the 15th of January, of his work and proceedings, and shall report in detail the number of inspectors he has appointed and employed, with their expenses and disbursements and the amount of salary paid the same, and he may from time to time issue bulletins of information, when in his judgment the interests of the state would be promoted thereby.

The said commissioner shall maintain an office and laboratory, where the business of said department may be conducted. This section shall not affect the term of office of the present

commissioner, and shall be regarded as having been appointed under the provisions of this Act.

Sec. 2. *Power of Commissioner and Inspectors Making Inspection.* The State Food Commissioner, and such inspectors and agents as shall be duly authorized for the purpose, when and as often as they may deem it necessary for the purpose of determining whether any manufactured food complies with the law, shall examine the raw materials used in the manufacture of food products and determine whether any filthy, decomposed or putrid substance is used in their preparation. They may also examine all premises, carriages or carts where food is manufactured, transported, stored or served to patrons, for the purpose only of ascertaining their sanitary condition and examining and taking samples of the raw materials and finished products found therein; but nothing in this act shall be construed as permitting such officers to inquire into, or examine methods of processes of manufacture, or requiring or compelling proprietors or manufacturers, or packers of proprietary or other food products, to disclose trade rights or secret processes, or methods of manufacture. Said commissioner, inspectors and agents shall have power and authority to open any package, can or vessel, containing or supposed to contain, any article manufactured, sold or exposed for sale, or held in possession with intent to sell, in violation of the provisions of this Act, or laws that now exist, or that may hereafter be enacted in this State, and may inspect the contents thereof, and may take samples therefrom for analysis. The employes of railroads, express companies or common carriers shall render to them all the assistance in their power, when so requested, in tracing, finding or disclosing the presence of any article prohibited by law, and in securing samples thereof as hereinafter provided for.

Sec. 3. *Refusal to Assist Inspector a Misdemeanor.* Any refusal or neglect on the part of such employes of railroads, express companies or other common carriers, to render such friendly aid, or to furnish such samples for analysis, as provided for

in section 2 of this Act, shall be deemed a misdemeanor, and shall be punished as hereinafter provided.

Sec. 4. The person taking such sample as provided for in section 2 of this Act, shall in the case of bulk or broken package goods divide the same into two equal parts, as nearly as may be, and in case of sealed and unbroken packages he shall select two of said packages, which two said packages shall constitute the sample taken and, properly to identify the same, he shall, in the presence of the person from whom the same is taken, mark or seal each half or part of such sample with a paper seal or otherwise, and shall write his name thereon and number each part of said sample with the same number, and also write thereon the name of the said dealer in whose place of business the sample is found, and the person from whom said sample is taken shall also write his own name thereon, and at the same time the person taking said sample shall give notice to such person from whom said sample is taken that said sample was obtained for the purpose of examination by the State Food Commissioner. One part of said sample shall be taken by the person so procuring the same to the State Analyst or other competent person appointed for the purpose of making examinations or analyses of samples so taken, and the person taking such sample shall tender to the person from whom it is taken the value of that part thereof so retained by the person taking said sample; the other part of said sample shall be delivered to the person from which said sample is taken. If the person from whom said sample is taken has recourse upon the manufacturer or guarantor, either by operation of law or under contract for any failure of the part of said sample to comply with the provisions of this Act, then said person from whom said sample is taken shall retain for the period of ninety days that part of said sample so delivered to him in order that said manufacturer or guarantor may have the same examined or analyzed if he so desires.

*Provided*, that the person procuring said sample may securely pack and box that part thereof retained by him and send the same to the State Analyst, or other competent person appointed here-

under for the purpose of making examinations or analyses of samples, and his testimony that he did procure the sample and that he sealed and numbered the same as herein provided, and that he wrote his name thereon and that he packed and boxed said part thereof and sent the same to the State Analyst, or other competent person appointed hereunder to analyze such sample, and the testimony of the person to whom said package or box is addressed that he received the same in apparent good order, that said sample was sealed, and that the number thereof and name of the sender, as herein provided for, was on said sample, and that the seal at the time the same was received was unbroken, shall be *prima facie* evidence that the sample so received is the sample that was sent, and that the contents thereof are the same and in the same condition as at the time the person so procuring said sample parted with the possession thereof, and the testimony of said two witnesses as above shall be sufficient to make such *prima facie* proof.

Sec. 5. *Manufacturing Adulterated or Misbranded Food Misdemeanor.* It shall be unlawful for any person to manufacture for sale within the State of Illinois any article of food or drink which is adulterated or misbranded within the meaning of this Act, and any person who shall violate any of the provisions of this section shall be guilty of misdemeanor and on conviction thereof, shall be punished according to the provisions of this Act.

*Provided*, that no article of food shall be deemed misbranded or adulterated within the provisions of this Act when intended for export to any foreign country or purchaser, and prepared or packed according to the specifications or directions of the foreign country to which said article is intended to be shipped; but if said article shall be in fact sold or offered for sale for domestic use or consumption, then this proviso shall not except said article from the operation of any of the other provisions of this Act.

Sec. 6. *Possession Misbranded or Adulterated Articles* *Provided.* The having in possession of any article of food

or drink which is misbranded or adulterated with intent to sell the same, is hereby prohibited; and whoever shall have in his possession with the intent to sell, sell or offer for sale any article which is adulterated or misbranded within the meaning of this Act, shall be guilty of a misdemeanor, and on conviction thereof shall be punished as hereinafter provided. Proof that any person, firm or corporation has or had possession of any article which is adulterated or misbranded shall be *prima facie* evidence that the possession thereof is in violation of this section.

Sec. 7. *Term Food Defined.* The term "food," as used herein, shall include all articles used for food, drink, confectionery or condiment by man or other animals, whether simple, mixed or compound, and any substance used as a condiment in the manufacture thereof.

Sec. 8. *Defines Adulteration.* That for the purpose of this Act an article shall be deemed to be adulterated—

In case of confectionery:

*First*—If it contains terra alba, barytes, talc, chrome yellow, paraffin, mineral fillers or poisonous substances, or poisonous color or flavor.

*Second*—If it contains any ingredient deleterious or detrimental to health, or any vinous, malt or spiritous liquor or compound, or narcotic drug.

In case of food:

*First*—If any substance has been mixed or packed with it so as to reduce or lower or injuriously affect its quality, strength or purity.

*Second*—If any substance has been substituted wholly or in part for the article.

*Third*—If any valuable constituent of the article has been wholly or in part abstracted: *Provided*, that in the manufacture of skim or separated cheese the whole or part of the butter fats in the milk may be abstracted.

*Fourth*—If it be mixed, colored, powdered, coated, polished or stained in any manner whereby damage or inferiority is con-

cealed, or it is made to appear better or of greater value than it really is.

*Fifth*—If it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health: *Provided*, that when the preparation of food products for shipment they are preserved by an external application, applied in such a manner that the preservative is necessarily removed mechanically, or by maceration in water, or otherwise, and directions for the removal of said preservatives shall be printed on the covering of the package, the provisions of this Act shall be construed as applying only when such products are ready for consumption; and formaldehyde, hydrofluoric acid, boric acid, salicylic acid and all compounds and derivatives thereof are hereby declared unwholesome and injurious.

*Sixth*—If it consists in whole or in part of a filthy, decomposed or putrid, infected, tainted or rotten animal or vegetable substance or article, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal, or one that has died otherwise than by slaughter.

Sec. 9. *Misbranded Defined.* The term "misbranded," as used herein, shall apply to all articles of food or drink, or articles which enter into the composition of food or drink, the packages or label of which shall bear any statement, design or device regarding such article, or the ingredients or substance contained therein which shall be false or misleading in any particular; and to any such products which are falsely branded as to manufacturer, packer or dealer who sells the same, or as to the state, territory or country in which it is manufactured or produced. That for the purpose of this Act an article shall be deemed misbranded—

In case of food:

*First*—If it be an imitation of or offered for sale under the distinctive name of another article.

*Second*—If it be labeled or branded so as to deceive or mislead the purchaser, or purports to be a foreign product when not so, or if the contents of the package as originally put up shall



have been removed in whole or in part and other contents shall have been placed in such package, or if it shall fail to bear a statement on the label of the quantity or proportion of any morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate or acetanilid, or any derivative or preparation of any such substances contained therein.

*Third*—If in any package form and the contents are stated in terms of weight or measure, they are not correctly and plainly stated on the outside of the package.

*Fourth*—If it be a manufactured article of food or food sold in package form, and is not distinctly labeled, marked or branded with the true name of the article, and with either the name of the manufacturer and place of manufacture or the name and address of the packer or dealer who sells the same.

*Fifth*—If the package containing it or its label shall bear any statement, design or device regarding the ingredients of the substance contained therein, which statement, design or device shall be false or misleading in any particular: *Provided*, that an article of food which does not contain any added poisonous or deleterious ingredients shall not be deemed to be adulterated or misbranded in following cases:

*First*—In case of mixtures or compounds which may be now, or from time to time hereafter known as articles of food under their own distinctive names, and not an imitation of or offered for sale under the distinctive name of another article, if the name be accompanied on the same label or brand with a statement of the place where the article has been manufactured or produced.

*Second*—In case of articles labeled, branded or tagged so as to plainly indicate that they are compounds, imitations or blends, and the word "compound," "imitation," or "blend," as the case may be, is plainly stated on the package in which it is offered for sale: *Provided*, that the term "blend," as used herein, shall be construed to mean a mixture of like substances, not excluding harmless coloring or flavoring ingredients used for the purpose of coloring and flavoring only; and as applied

to alcoholic beverages, only those distilled spirits shall be regarded as "like substances" which are distilled from the fermented mash of grain and are of the same alcoholic strength: And, *provided, further*, that nothing in this Act shall be construed as requiring or compelling proprietors or manufacturers of proprietary foods, which contain no unwholesome added ingredients, to disclose their trade formulas, except in so far as the provisions of this Act may require to secure freedom from adulteration or misbranding.

*Third*—In the case of mixtures of corn syrup (glucose) or corn sugar (dextrose) or corn sugar syrup, with cane or beet sugar (sucrose) or cane or beet sugar syrup, in food, if the maximum percentage of corn syrup (glucose), or corn sugar (dextrose) or corn sugar syrup, in such article of food be plainly stated on the label.

Sec. 10. *Confiscation and Condemnation of Misbranded or Adulterated Foods.* Any articles of food or drink or liquor that is adulterated or misbranded within the meaning of this Act, and is being sold or offered for sale in the State of Illinois, shall be liable to be proceeded against in any circuit court, or the Superior Court of Cook County, or the municipal court of any city, or before any justice of the peace within whose jurisdiction the same may be found, and seized for confiscation by process of law or condemnation. And if such article is condemned as being adulterated or misbranded, or of a poisonous or deleterious character within the meaning of this Act, the same shall be disposed of by destruction or sale, as the said court may direct, and the proceeds thereof, if sold, less the legal costs and charges, shall be paid into the treasury of the State of Illinois and credited to the fund of the State Food Commission, to be used in the enforcement of the State food laws, but such goods shall in no instance be sold contrary to the provisions of this Act: *Provided, however*, that upon the payment of the costs of such libel proceedings and the execution and the delivery of a good and sufficient bond to the effect that such articles shall not be sold

or otherwise disposed of contrary to the provisions of this Act, the court may, by order, direct that such articles be delivered to the owner thereof. Either party may demand trial by jury upon any issue of fact joined in any such case, and all such proceedings shall be at the suit of and in the name of the People of the State of Illinois.

Sec. 11. *Vinegar to Be Branded.* All vinegar made by fermentation and oxidation without the intervention of distillation, shall be branded with the name of the fruit or substance from which the same is made. All vinegar made wholly or in part from distilled liquor shall be branded "distilled vinegar," and shall not be colored in imitation of cider vinegar. All vinegar shall be made wholly from the fruit or grain from which it purports to be or is represented to be made, shall contain no foreign substance, and shall contain not less than four per cent. by weight, of absolute acetic acid.

Sec. 12. *Extracts to Be Labeled.* Extracts made of more than one principle shall be labeled in a conspicuous manner with the name of each principle, or else with the name of the inferior or adulterant; and in all cases when an extract is labeled with two or more names, such names must be in a conspicuous place on said label, and in no instance shall such mixture be called imitation, artificial or compound, and the name of one of the articles used shall not be given greater prominence than another: *Provided*, that all extracts which cannot be made from the fruit, berry, bean or other part of the plant, and must necessarily be made artificially, as raspberry, strawberry, etc., shall be labeled "imitation," in letters similar in size and immediately preceding the name of the article: *Provided, further*, that prepared cocoanut, containing nothing other than cocoanut sugar and glycerine, shall be labeled as prepared cocoanut, and when so made need not be labeled "compound" or "mixture."

Sec. 13. *Baking Powder—How Labeled.* No person by himself, his servant or his agent, or as the servant of any other person, shall, *first*, make or manufacture baking powder or any other mixture or compound intended for use as baking powder;

*second*, or sell, exchange, deliver or offer for sale or exchange such baking powder or any mixture or compound intended for use as baking powder, unless the same shall contain not less than ten per cent. available carbon dioxide and unless the common names of all the ingredients be printed on the label.

Sec. 14. *Adulterated Spirituous, Malt or Vinous Liquors Prohibited.* No person shall, within this State, by himself, his servant or agent, or as a servant or agent of any other person or corporation, manufacture, brew, distill, have or offer for sale, or sell any spirituous or fermented or malt liquor, containing any drug, substance or ingredient not healthful or not normally existing in said spirituous, fermented or malt liquor, or which may be deleterious or detrimental to health when such liquors are used as a beverage, and the following drugs, substances or ingredients shall be deemed to be not healthful and shall be deemed to be deleterious or detrimental to health when contained in such liquors, to-wit: *Cocculus indicus*, copperas, opium, cayenne pepper, picric acid, Indian hemp, strychnine, arsenic, tobacco, darnel seed, extract of logwood, salts of zinc, copper or lead, alum, methyl, alcohol and its derivatives and any extracts or compound of any of the above drugs, substances or ingredients, and any person violating any of the provisions of this section shall be deemed guilty of a misdemeanor.

Sec. 15. *Mutilating Label Prohibited.* Whoever shall deface, change, erase or remove any mark, label or brand provided for this Act with intent to mislead, deceive or to violate any of the provisions of this Act, shall be held liable to the penalties of this Act.

Sec. 16. *Sale of Unclean or Unwholesome Milk for Consumption and Unsanitary Containers Prohibited.* No person firm or corporation shall offer for sale, or sell to any person, firm or corporation, creamery or cheese factory, any unclean, unhealthful, unwholesome or adulterated milk or cream, or any milk or cream which has not been well cooled or to which water or any foreign substance has been added or milk or cream which has been handled or transported in unclean or unsanitary



ENGLISH MILK FLOAT TAKING THE MILK TO TOWN.

Photographed by Prof. E. H. Farrington.

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vessels or containers: *Provided*, that nothing in this section shall be construed to prevent the sale of skim milk to factories engaged in the manufacture of skim milk products, nor the sale of skim milk under the provisions of Section 19 of this Act.

Sec. 17. *Persons Receiving Milk to Wash Cans.* Any person, firm or corporation who receives from any other person, firm or corporation, any milk or cream in cans, bottles or vessels which have been transported over any railroad or boat line, where such cans, bottles or vessels are to be returned, shall cause the said cans, bottles or vessels to be emptied before the said milk or cream contained therein shall become sour, and shall cause said cans, bottles or vessels to be immediately washed and thoroughly cleansed and aired.

Sec. 18. *Not to Manufacture Food from Impure or Unclean Milk or Cream.* No person, firm or corporation shall manufacture from unclean, impure, unhealthful or unwholesome milk, or from cream from the same, any article of food.

Sec. 19. *Sale of Skim Milk—Cans—How Labeled.* No person, firm or corporation shall sell, or expose for sale, or have in his possession with intent to sell, in any store or place of business, or on any wagon or other vehicle, used in transporting milk or milk commonly called "skim milk" without first attaching to the can, vessel or other package containing said milk, a tag with the words "skim milk" printed on both sides of said tag in large letters, each letter being at least three-fourths of an inch high and one-half inch wide. Said tag shall be attached to the top or side of said can, vessel or package where it can be easily seen.

Sec. 20. *Instruments for Measuring Milk and Cream Standards.* The State standard milk measure or pipettes shall have for milk a capacity of seventeen and six-tenths cubic centimeters, and the State standard test tube or bottles for milk shall have a capacity of two cubic centimeters of mercury at a temperature of sixty degrees Fahrenheit between "zero" and ten on the graduated scale marked on the necks thereof. For cream eighteen grams shall be used and the standard test tubes or

bottles for cream shall have a capacity of six cubic centimeters of mercury at a temperature of sixty degrees Fahrenheit between "zero" and thirty on the graduated scale marked on the necks thereof, and it is hereby made a misdemeanor to use any other measure, pipette, test tube or bottle to determine the per cent. of butter fat where milk or cream is purchased by, or furnished to creameries or cheese factories, and where the value of said milk is determined by the per cent. of butter fat contained in the same. Any manufacturer, merchant, dealer, or agent in this State who shall offer for sale or sell cream or milk pipette or measure, test tube or bottle which is not correctly marked or graduated, as herein provided, shall be guilty of a misdemeanor and upon conviction thereof shall be punished as provided in this Act.

Sec. 21. *Underreading Babcock Test Prohibited.* It shall be unlawful for the owner, manager, agent or any employe of a creamery or cheese factory to manipulate or underread the Babcock test, or any other contrivance used for determining the quality or value of milk, or to falsify the record thereof, or to pay for such milk on the basis of any measurement except the true measurement, as thereby determined.

Sec. 22. *Sale of Preservatives Prohibited.* No person, firm or corporation shall manufacture for sale, advertise, offer or expose for sale, or sell, any mixture or compound intended for use as a preservative or other adulterant of milk, cream, butter or cheese, nor shall he manufacture for sale, advertise, offer or expose for sale, or sell, any unwholesome or injurious preservative of any food: *Provided, however,* that this section shall not apply to pure salt added to butter and cheese.

Sec. 23. *Vehicles to Be Marked.* Any person, firm or corporation, who shall in any of the cities, incorporated towns or villages of this State which contains a population of 5,000 or over, engage in or carry on a retail business in the sale or exchange of, or any retail traffic in milk or cream, shall have each and every carriage or vehicle from which the same is vended,



conspicuously marked with the name of such vendor on both sides of such carriage or vehicle.

Sec. 24. *Illegal Lard.* No person shall, within this State, manufacture for sale, have in his possession with intent to sell, offer or expose for sale, or sell, as lard, any substance not the legitimate and exclusive product of the fat of the hog.

Sec. 25. *Lard Substitute.* No person shall manufacture for sale within this State, or have in his possession with intent to sell, offer or expose for sale, or sell, as lard, or as a substitute for lard, or as an imitation of lard, any mixture or compound which is designed to take the place of lard and which is made from animal or vegetable oils or fats other than the fat of the hog, or any mixture or combination with any animal or vegetable oils or fats, unless the tierce, barrel, tub, pail or package containing the same shall be distinctly and legibly branded or labeled with the name of the person, firm or corporation making the same, together with the location of the manufactory and the words "lard substitute" or "adulterated lard" or "compound," "imitation" or "blend," as the case may be, or unless the same shall be sold under its own distinctive name, as provided for in section 9 of this Act.

Sec. 26. *Persons Selling Imitation or Substitute for Lard to Inform Purchaser.* It shall be unlawful to sell or offer for sale any "lard substitute" or "adulterated lard" or "compound," "imitation" or "blend," as herein defined, without informing the purchaser thereof, or the person or persons to whom the same is offered for sale, that the substitute sold or offered for sale is "lard substitute" or "adulterated lard" or "compound," "imitation" or "blend," as the case may be.

Sec. 27. *Sale of Process Butter Not Branded Prohibited.* No person, firm or corporation, agent or employe, shall manufacture for sale, sell, offer or expose for sale, in this State, any butter that is produced by taking original packing stock butter, or other butter, or both, and melting same so that the butter fat can be drawn off or extracted, then mixing the said butter fat with skimmed milk, or milk, or cream, or other milk product,

and rechurning or reworking the said mixture, or that produced by any process that is commonly known as boiled, process or renovated butter, unless the same is branded or marked, as provided in section 28 of this Act.

Sec. 28. *Process Butter—How Branded.* No person, firm, corporation, agent or employe, shall sell, offer or expose for sale, or deliver to a purchaser, any boiled, process or renovated butter, as defined in section 27 of this Act, unless the words "Renovated Butter" shall be plainly branded with gothic or bold face letters at least three-fourths of an inch in length on the top and sides of each tub, or box, or pail, or other kind of case or package, or on the wrapper of prints or rolls or bulk packages in which it is put up. If such butter is exposed for sale uncovered or not in a case or package, a placard containing the label so printed shall be attached to the mass of butter in such a manner as to be easily seen and read by the purchaser. The branding or marking of all packages shall be in the English language, and in a conspicuous place so as to be easily seen and read by the purchaser.

Sec. 29. *Illegal Foods to be Seized.* Whenever the commissioner or his agents shall have ground for suspicion that any article of food, found in possession of any person, firm or corporation, is adulterated or misbranded within the meaning of this Act, he may seize such article of food and make an inventory thereof, and shall leave a copy of such inventory with the party holding such suspected goods, and tag the same "suspected"; and he shall notify in writing the person, firm or corporation in whose possession it may be found, not to offer the same for sale or sell or otherwise dispose of the same until further notice in writing from the commissioner. Whereupon the commissioner shall forthwith cause a sample of said article of food to be examined or analyzed, and if the same shall be found to be adulterated or misbranded within the meaning of this Act, the commissioner shall proceed with a hearing and subsequent proceedings as provided in this Act. If, however, such examination or analysis shall show that such article of food complies with the pro-

visions of this Act, the person, firm or corporation in whose possession such article of food is found shall forthwith be notified in writing that such seizure is released, and authority given to dispose of such article of food. Such seizure may be had without a warrant and said commissioner, and all inspectors and agents appointed pursuant to law, are hereby given full power and authority of "policemen." Any court having jurisdiction, upon receiving proof of probable cause for believing in the concealment of dairy food or dairy products or substitutes therefor, or imitation thereof, kept for sale or for a purpose, or had in possession or under control, contrary to the provisions of this Act, or other laws which now exist or may be hereafter enacted, shall issue a search warrant and cause a search to be made in any place therefor and to that end may cause any building, enclosure, wagon or car to be entered, and any apartment, chest, box, locker, tub, jar, crate, basket or package to be broken open and the contents thereof examined.

Sec. 30. *Search Warrants to be Issued for Illegal Food.*

All warrants issued pursuant to section 29 hereof shall be directed to the sheriff, bailiff or some constable of the country where such food or dairy products may be supposed to be concealed, commanding such officer to search the house or place where such food or dairy product, or substitute thereof, or imitation thereof, for which he is required to search, is believed to be concealed, which place and the property to be searched for, shall be designated in the warrant, and to bring such food or dairy product or substitute therefor or imitation thereof, when found, and the person in whose possession the same is found, before the magistrate who issued the warrant, or before some other court or magistrate having jurisdiction of the case to be proceeded against as hereinbefore provided for in section 10 of this Act.

Sec. 31. *State's Attorney to Assist.* It shall be the duty of the State's Attorney in any county of this State when called upon by the commissioner, or any of his assistants to render any legal assistance in his power to execute the law and to prosecute cases arising under the provisions of this Act: *Provided,*

That no person shall be prosecuted under the provisions of this Act for selling or offering for sale any article of food or drugs as defined herein, when same is found to be adulterated or misbranded within the meaning of this Act. in the original unbroken package in which it was received by said person when he can establish a guaranty signed by the wholesaler, jobber, manufacturer or other party residing in this State, from whom he purchased such article, to the effect that the same is not adulterated or misbranded in the original unbroken package in which said article was received by said dealer, within the meaning of this Act, designating it. Said guaranty to afford protection, shall contain the name and address of the party or parties making the sale of such article to such dealer, and in such case said party or parties shall be amenable to the prosecutions, fines and other penalties as provided for in this Act: *Provided*, That no such guaranty shall operate as a defense to prosecutions for the violation of this Act. *First*. If the dealer shall continue to sell after notice by the State Food Commissioner that such article is adulterated or misbranded within the meaning of this Act. *Second*. If the dealer shall fail to preserve for the manufacturer or guarantor and deliver to him upon demand the sample left with him by the commissioner or his agent.

Sec. 32. *State Board of Health to Furnish Samples*. The State Board of Health may submit to the commissioner or any of his assistants samples of food or drink for examination or analysis, and shall receive special reports showing the results of such examination or analysis.

Sec. 33. *State Analyst Shall not Furnish Certificate of Purity*. It shall be unlawful for the State Analyst or any assistant State Analyst to furnish to any individual, firm or corporation any certificate as to the purity or excellence of any article manufactured or sold by them to be used as food or in the preparation of food.

Sec. 34. *Using Shift or Device*. The use of any shift or device to evade any of the provisions of this Act shall be deemed a violation of such provision and punishable as herein provided.

Sec. 35. *Master's Liability, Etc.* Whoever shall, by himself or another, either as principal, clerk or servant, directly or indirectly, violate any of the provisions of this Act, shall be guilty of a misdemeanor and punished as herein provided.

Sec. 36. *Penalties, License Fees and Proceeds Paid to State Treasurer.* All fines, penalties, and all proceeds collected from goods confiscated and sold under the provisions of this Act and other laws relating to dairy and food products, and all license fees collected hereunder, shall be paid into the State Treasury.

Sec. 37. *Label—Size of Type.* The principal label on any package of food, as defined by this Act, shall be printed plainly and legibly in English with or without the foreign label in the language of the country where the product is produced or manufactured and the size of type, if not otherwise described in this Act, shall not be smaller than EIGHT-POINT (BRE-VIER) CAPS: *Provided*, That in case the size of the package will not permit the use of eight-point cap type, the size of the type may be reduced proportionately.

Sec. 38. *Food Commissioner to Make Rules and Regulations.* The State Food Commissioner shall make rules and regulations for carrying out the provisions of this Act, and shall have power to make rules and regulations for analyzing and reporting the results thereof, of articles submitted for analysis by the State Board of Health, and regulating the analyzing and reporting thereon of samples taken under any law or laws of the United States by any person hereunder, or furnished by any officer or employe charged with the enforcement of the laws of the United States relative to the manufacture, sale or transportation of adulterated, misbranded, poisonous or deleterious foods, dairy products or articles manufactured from dairy products or liquors.

Sec. 39. *Standard of Purity and Strength.* In the enforcement of this Act, and in the construction thereof, the following named articles of food stuffs, when offered for sale or exposed for sale, or sold, shall conform to the analytical requirements set opposite each respectively.

*Milk* shall contain not less than three (3) per cent. of milk fat and not less than eight and one-half (8.5) per cent. of solids, not fat.

*Condensed Milk and Evaporated Milk* shall contain not less than twenty-eight (28) per cent. of milk solids and one hundred (100) per cent. of such milk solids shall contain not less than twenty-seven and five-tenths (27.5) per cent. of milk fat.

*Cream* shall contain not less than eighteen (18) per cent. of milk fat.

*Maple Sugar* shall contain not less than sixty-five one hundredths (0.65) per cent of maple ash in the water-free substance.

*Honey* is lævo-rotatory, containing not more than twenty-five (25) per cent. of water, not more than twenty-five hundredths (0.25) per cent. of ash and not more than eight (8) per cent. of sucrose.

*Cloves* shall contain not more than five (5) per cent. of clove stems, not less than ten (10) per cent. of volatile ether extract, not less than twelve (12) per cent. of quercitannic acid, not more than eight (8) per cent. of total ash, not more than five-tenths (0.5) per cent. of ash insoluble in hydrochloric acid, and not more than ten (10) per cent. of crude fiber.

*Black Pepper* shall contain not less than six (6) per cent. of non-volatile ether extract, not less than twenty-five (25) per cent. of pepper starch, not more than seven (7) per cent. of total ash, not more than (2) per cent. of ash insoluble in hydrochloric acid, and not more than fifteen (15) per cent. of crude fiber.

*Lemon Extract* shall contain not less than five (5) per cent. of oil of lemon by volume.

*Orange Extract* shall contain not less than five (5) per cent. of oil of orange by volume.

*Vanilla Extract* shall contain in one hundred (100) cubic centimeters the soluble matters from not less than ten (10) grams of vanilla bean.

*Olive Oil* has a refractive index (25 degrees C.) not less than one and forty-six hundred and sixty ten thousandths

(1.4660) and not exceeding one and forty-six hundred and eighty ten thousandths (1.4680); and an iodine number not less than seventy-nine (79) and not exceeding ninety (90).

*All Vinegars* shall contain four (4) grams of acetic acid in one hundred (100) cubic centimeters (20 degrees C.)

*Cider Vinegar* shall contain not less than one and six-tenths (1.6) grams of apple solids, and not less than twenty-five hundredths (0.25) grams of apple ash in one hundred (100) cubic centimeters (20 degrees C.)

*Wine Vinegar* shall contain not less than one (1) gram of grape solids and not less than thirteen-hundredths (0.13) gram of grape ash in one hundred cubic centimeters (20 degrees C.)

*Malt Vinegar* shall contain in one hundred (100) cubic centimeters (20 degrees C.) not less than two (2) grams of solids and not less than two-tenths (0.2) gram of ash.

In the enforcement of this Act and the construction thereof all articles of food not defined in this Act, when offered for sale or exposed for sale, or sold, shall conform to the definition and analytical requirements of the standard adopted and promulgated from time to time by the State Food Standard Commission: *Provided*, such standards for any article of food or drink, or for any substance used or intended to be used in food or drink shall be deemed *prima facie* evidence of the proper standard of quality, purity and strength of any such article or substance, but shall only be deemed such *prima facie* evidence in the trial of cases brought in the proper courts to enforce the provisions of this Act.

*Provided*, That nothing in this section shall be construed to prevent the sale of any wholesome food product which varies from such standards, if such article of food be labeled so as to clearly indicate such variation.

Sec. 40. *Preliminary Hearing by the Commissioner.* When it appears from the examination or analysis that the provisions of this Act have been violated, the Food Commissioner shall cause notice of such fact, together with a copy of the findings, to be given to the party or parties from whom the sample was obtained; and to the party, if any, whose name appears upon

the label as manufacturer, packer, wholesaler, retailer, or other dealer, by registered mail. The receipt of the post office department for such registered notice shall be received as *prima facie* evidence that such notice has been given. The party, or parties, so notified, shall be given an opportunity to be heard under such rules and regulations as may be prescribed aforesaid. Notices shall specify the date, hour and place of the hearing. The hearing shall be private, and the parties interested therein may appear in person or by attorney. If, after such hearing, the commissioner shall believe this Act has been violated, he shall cause the party, or parties, whom he believes to be guilty, to be prosecuted forthwith, under the provisions of this Act. No action or prosecution shall be instituted against any person for a violation of the provisions of this Act, unless the same shall have been commenced within ninety days from the taking of said sample.

Sec. 41. *Penalty.* Any person convicted of violating any of the provisions of the foregoing Act shall, for the first offense, be punished by a fine in any sum not less than fifteen (15) dollars, and not more than one hundred (100) dollars, or by imprisonment in the county jail not exceeding thirty days, or by both such fine and imprisonment, in the discretion of the Court, and for the second and each subsequent offense by a fine of not less than twenty-five (25) dollars and not more than two hundred (200) dollars, or by imprisonment in the county jail not exceeding one year, or both, in the discretion of the Court; or the fine above may be sued for and recovered before any justice of the peace or any other court of competent jurisdiction in the county where the offense shall have been committed, at the instance of the State Food Commissioner or any other person in the name of the People of the State of Illinois as plaintiff and shall be recovered in an action of debt.

Sec. 24. *Judgment—Issuing Capias.* When the rendition of the judgment imposes a fine as provided in any of the sections of this Act, it shall be the duty of the Justice of the Peace or other court rendering such judgment also to render a judgment for costs and such Justice of the Peace or other court shall



forthwith issue a capias or warrant of commitment against the body of the defendant, commanding that unless the said fine and costs be forthwith paid the defendant shall be committed to the jail of the county and the constable or other officer, to whose hands said capias or warrant shall come, shall in default of such payment arrest the defendant and commit him to the jail of the county, there to remain as provided in Section 171 of "An Act to revise the law in relation to criminal jurisprudence," in force July 1, 1885, unless such fine and costs shall sooner be paid.

Sec. 43. *Repeal.* All acts and parts of Acts inconsistent with this Act are hereby repealed: *Provided*, That nothing in this Act contained shall be construed as repealing the act entitled "An Act to regulate the manufacture and sale of substitutes for butter," approved June 14, 1897, in force July 1, 1897, or any part thereof.

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## Food and Dairy Law.

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An Act to regulate the manufacture and sale of substitutes for butter.

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That for the purpose of this Act, every article, substitute or compound or any other than (that) which is produced from pure milk or cream therefrom, made in the semblance of butter and designed to be used as a substitute for butter made from pure milk or its cream is hereby declared to be imitation butter: *Provided*, that the use of salt and harmless coloring matter for coloring the product of pure milk or cream shall not be construed to render such product an imitation.

Sec. 2. No person shall coat, powder or color with annato or any coloring matter whatever, any substance designed as a substitute for butter, whereby such substitute or product so colored or compounded shall be made to resemble butter, the product of the dairy.

No person shall combine any animal fat or vegetable oil or other substance with butter, or combine therewith, or with animal fat or vegetable oil, or combination of the two, or with either one, any other substance or substances, for the purpose or with the effect of imparting thereto a yellow color or any shade of yellow so that such substitute shall resemble yellow or any shade of genuine yellow butter, nor introduce any such coloring matter or such substance or substances into any of the articles of which the same is composed.

*Provided*, Nothing in this Act shall be construed to prohibit the use of salt, rennet and harmless coloring matter for coloring the product of pure milk or cream from the same.

No person shall, by himself, his agents, or employes produce or manufacture any substance in imitation or semblance of nat-

ural butter, nor sell, nor keep for sale, nor offer for sale, any imitation butter, made or manufactured, compounded or produced in violation of this section, whether such imitation butter shall be made or produced in this State or elsewhere.

This section shall not be construed to prohibit the manufacture and sale, under the regulations hereinafter provided, of substances designed to be used as a substitute for butter and not manufactured or colored as herein provided.

Sec. 3. Every person who lawfully manufactures any substance designed to be used as a substitute for butter, shall mark by branding, stamping or stenciling upon the top or side of each box, tub, firkin or other package in which such article shall be kept, and in which it shall be removed from the place where it is produced, in clear and durable manner in the English language, the word "oleomargarine," or the word "butterine," or the words "substitute for butter," or the words "imitation butter," in printed letters in plain Roman type, each of which shall not be less than three-quarters of an inch in length.

Sec. 4. It shall be unlawful to sell or offer for sale any imitation butter without informing the purchaser thereof, or the person or persons to whom the same is offered for sale, that the substance sold or offered for sale is imitation butter.

Sec. 5. No person, by himself or others, shall ship, consign or forward by any common carrier, whether public or private, any substance designed to be used as a substitute for butter unless it shall be marked or branded on each tub, box, firkin, jar or other package containing the same, as provided in this Act, and unless it be consigned by the carriers and receipted for by its true name: *Provided*, that this Act shall not apply to any goods in transit between foreign states across the State of Illinois.

Sec. 6. No person shall have in his possession or under his control any substance designed to be used as a substitute for butter, unless the tub, firkin, jar, box or other package containing the same be clearly and durably marked as provided in this Act: *Provided*, that this section shall not be deemed to apply to per-

sons who have the same in their possession for the actual consumption of themselves (or) their families. Every person who shall have possession or control of any imitation butter for the purpose of selling the same which is not marked as required by the provisions of this Act, shall be presumed to have known during the time of such possession or control the true character and name, as fixed by this Act, of such product.

Sec. 7. Whoever shall have possession or control of any imitation butter or any substance designed to be used as a substitute for butter, contrary to the provisions of this Act, for the purpose of selling the same, or offering the same for sale, shall be held to have possession of such property with intent to use it in violation of this Act.

Sec. 8. No action shall be maintained on account of any sale or contract made in violation of, or with intent to violate, this Act by or through any person, who was unknowingly a party to such a wrongful sale or contract.

Sec. 9. Whoever shall deface, erase or remove any mark provided by this Act, with intent to mislead, deceive, or to violate any of the provisions of this Act, shall be guilty of a misdemeanor.

Sec. 10. Whoever shall violate any of the provisions of this Act shall be punished by a fine of not less than \$50 nor more than \$200, or by imprisonment in the county jail not to exceed 60 days for each offense, or by both fine and imprisonment, in the discretion of the court, or the fine alone may be sued for and recovered before any Justice of the Peace in the county where the offense shall be committed, at the instance of any person in the name of the People of the State of Illinois as plaintiff.

Sec. 11. It is hereby made the duty of the State's Attorney of each county in this State to prosecute all violations of this Act upon complaint of any person, and there shall be taxed as his fees in the case the sum of ten dollars (\$10), which shall be taxed as costs in the case.

### AUXILIARY MEETINGS.

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During the year seven auxiliary or one day meetings were held, besides the annual State convention of three days at Clinton.

The year before was the first of these auxiliary meetings on the part of the association and the results the first year were gratifying. But this year's meetings were successful beyond expectation, and the officers hope the coming year to hold more of these meetings and thus reach a still greater number of dairymen.

The meetings at Union and Marengo were held March 15, at Union in the forenoon and Marengo in the afternoon. The speakers for the association were Dr. Wright, State Veterinarian; W. W. Marple, of Chicago, and J. P. Mason, of Elgin.

The hall was crowded at Union, but rain in the afternoon interfered somewhat with the meeting at Marengo. Both, however, were successful.

The meeting at Limestone April 7 was very well attended. It was in charge of J. F. Sanmann, of Savanna, and the speakers were Dr. Wright, State Veterinarian; Dr. Scott, of Peoria, and Prof. C. E. Lee, of Illinois University dairy department.

The meetings at Sigel, Effingham, Montrose and Altamont were in charge of A. F. Jansen, of Effingham, and his reports of these meetings follow:

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### MEETING AT EFFINGHAM, MARCH 31, 1909.

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Meeting called to order by W. Hirtzel, president of the Effingham County Dairy Association. Secretary H. Goldstein read report and minutes of last meeting. A. F. Jansen was introduced to make a report of State Dairy Convention at Clinton. After giving a report of the convention in detail and calling attention to the necessity of considering the tuberculosis situation, Mr. Jan-

sen called on Mr. G. G. Council, of Vandalia, who had just come from Springfield, where he attended the tuberculosis conference in session there March 30. Mr. Council gave a report of that conference and resolutions adopted, which same resolutions were also endorsed by vote, at the Effingham, Altamont and Montrose meetings. A bill before the legislature to appropriate \$6,000 for premium at the State Fair, for dairy cattle raised and owned by Illinois dairy cattle breeders; \$1,000 each for the six distinct dairy breeds, Holstein, Dutch Belted, Jersey, Guernsey, Ayer-shire and Brown Swiss. It was favorably voted upon and a report of the action ordered sent to the general assembly members of this district.

Mr. C. C. Hayden, of the University of Illinois, was then introduced and gave a very instructive talk on feeds and feeding, telling which different kinds of feed, in right proportion to each other, would make a balanced ration, what feeds or plants for dairy cattle would grow most profitable in this section of the State.

The next speaker at this meeting, Mr. S. B. Shilling, president of the National Dairy Union, was then introduced. He held the audience attentive and deeply interested from beginning to end in his usual humorous, pleasant way, talking about the necessity and great advantage of dairy farming as a means of building up, restoring the fertility and productiveness of worn out land. The problem of fair deal farming—"that is, giving something back to the soil for what we take from it," cannot be more convincingly or forcefully explained and talked over, than explained by Mr. Shilling at this meeting. Three years ago Mr. Shilling addressed the farmers around Effingham, when the State Dairy Convention was held there, about the great advantage of silage and other important things. What he said proved true, and the results of following his advice at the time are very plainly visible now. In three years more we will see further development as a result of this last good talk from him.

Mr. M. Began, superintendent of the Van Camp milk condensory at Effingham, was introduced as the last speaker at this



STRAINING MILK ON A DANISH FARM.

Photographed by Prof. E. H. Farrington.

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UNIVERSITY OF ILLINOIS



meeting. He gave a very interesting talk about dairy development at his native place, Watertown, Wis., which has been a dairy country for over 30 years or more. He told how the land was brought up above its original fertility and said that what dairying had done for that country it surely could do here, as climatic conditions were far more favorable here than in Wisconsin. (He asserted, if they had no colder days in Wisconsin than we had here this winter, farmers up there would try to raise corn all the year round).

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MEETING HELD AT ALTAMONT, APRIL 1, 1909.

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Meeting called to order by Director A. F. Jansen, who also acted as chairman. Song: E. N. Upton, of Effingham, "I Am the Holstein Man."

First speaker introduced was Prof. C. C. Hayden, of the State University. He gave his instructive and much needed talk on "Feeds and Feeding," and what kind of crops most profitable to raise in the locality, as on that point greatly depends the profitability of the dairy business for the farmer engaged in it. He had to shorten his talk somewhat on account of having to leave for his train.

Next speaker was S. B. Shilling, president of the National Dairy Union. His subject was "The Necessity of More Systematic Farming." He explained to the attending audience which crowded the hall, the unavoidable future consequence of the present usual method of farming, farming without a proportionate number of live stock to the number of acres farmed, through which the farm products ought to be marketed, in order to again produce the necessary fertilizer to put back on the land, where the crops are taken from. He explained how that could not be accomplished in a better way than by intelligent dairy farming.

The last speaker of the meeting was M. C. Began, superintendent of Van Camp condensory at Effingham. That company having a shipping station at Altamont, he spoke principally of prevailing conditions and development of the dairy industry, what effect it had on entire surrounding country.

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#### DAIRY MEETING AT MONTROSE, APRIL 2, 1909.

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Meeting called to order by A. F. Jansen, director, State Dairy Association. Music by Montrose Band. First speaker called upon was S. B. Shilling. He pointed out, in his usual convincing, humorous way, the great benefit and advantage of energetic, systematic dairy farming. He said that what it had done in other localities, it could do here, and undoubtedly would if only taken hold of in the right way.

Prof. Carl E. Lee, of the State University, being introduced, talked in a very impressive way about handling and taking care of milk, as upon it depended to a great extent the quality of the finished product, be it condensed milk, butter or cheese. From an inferior raw material no first-class finished product could be made.

Third speaker at this meeting was M. B. Began. He spoke in his usual captivating, jovial way, about how the farmers in the greatest dairy state in the Union, had at first been very skeptical about new methods and changes from the old way; how they first wanted "to watch and see," and how they are convinced and the up-to-date dairymen are always studying to increase the profits of their business.

Uncle John Sligar, as he is familiarly called, was then introduced. He spoke about his experience in former years in handling dairy cattle and of his boyhood days on the farm.

## MEETING AT SIGEL, APRIL 3, 1909.

Meeting called to order by Director A. F. Jansen; music by Sigel Orchestra.

First speaker introduced was Rev. Father Pennartz, rector of St. Michaels Church at Sigel. He spoke in a very impressive way about the necessity of a more fair, systematic way of farming, as it has long ago been followed up in the old country where land has been in cultivation for many centuries, and, at the present time, is more productive than it formerly was. He called special attention to what our state agricultural school at Urbana is doing in the way of soil experimenting and crop producing under various treatment and conditions to develop and prove the most satisfactory result. He very urgently asked the attending farmers to appreciate the effort of the university more by getting the different bulletins published by the university on the various crops and other valuable information contained in them.

S. B. Shilling followed up Rev. Father Pennartz' talk in a more definite explanatory way, telling how and which way the most profitable farming could and should be carried on, under prevailing circumstances and conditions in this, our home country. He very urgently impressed the advantage and necessity of the co-operative creamery located at Sigel, and urged the farmers around their little town to uphold it and make it pay a better dividend.

Mr. Began kept the audience listening attentively about the dairy development in Southern Wisconsin; what difficulties they had to contend with there in the beginning; how dairying had changed some barren, worn out land to high state of productiveness; why this part of the country had decided advantage over Wisconsin, being a better corn country, more summer and less winter.

Uncle John Sliger spoke from his experiences as a farmer in boyhood days and now.

## COW PEAS AND HOW TO GROW THEM.

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By

A. M. Ten Eyck, Agronomist, and L. E. Call, Assistant in Soils, Kansas  
College of Agriculture.

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Because cow-peas are an important crop to dairymen, and particularly in some central and Southern districts of the state, a 1909 bulletin on the subject from the Kansas Experiment Station is here given:

The cow-pea, botanically named *Vigna unguiculata*, has long been recognized as a valuable crop for the Southern states, where it has been extensively grown for forage and green manuring, but it has only been within comparatively recent years that the general cultivation of this crop has extended into the Northern states. The cow-pea is a native of India, and it is supposed to have been introduced into this country from England in 1734 by the Oglethorpe colonies in Georgia. The cow-pea is an annual leguminous plant, varying in form and habit of growth with the variety, season, soil, moisture and cultural conditions. As a rule, it has a trailing habit of growth, vining profusely during seasons of heavy rainfall. The blossoms are of various colors, ranging from white to purple, while the pods are usually straw-colored when ripe and vary in length from five inches to over a foot. As a rule, the pods do not ripen at the same time. With many varieties there are periods of several weeks when all stages of growth, from blossoms to mature peas, may be found upon the same vine. This makes the time of cutting for seed a difficult matter to judge. The time must be selected for cutting when the largest number of pods are mature and before the peas have started to shell. The seeds vary greatly in size and shape. In color they range from white to the deepest black. The root

development is deep for an annual, there being a well-developed tap-root, with a number of large branch roots which start from the upper part of the tap-root, spread horizontally for a short distance and then turn downward. These roots go deeply into the subsoil, enabling the plant to draw freely upon the plant-food and water below the reach of shallower-rooted crops. Upon the numerous small roots in the upper surface of the soil are found nodules or tubercles which contain the nitrogen-gathering bacteria. These nodules are always present upon the well-developed plants. They enable the plants to make use of the nitrogen of the atmosphere.

#### **Make Excellent Hay.**

Cow-peas make excellent hay, which, if properly handled, is equal to alfalfa in nutritive value, although as a rule stock do not eat cow-pea hay as readily as alfalfa. When sown for hay it is usually preferable to plant in close drills, requiring about one bushel of seed peas per acre, and when so planted the plants tend to grow more upright, which makes the crop easier to cut with a mower. If grown in rows, although the production of forage may be as great, it is more difficult to harvest, and the ranker growth of the individual plants often makes the hay more woody. It is not an easy matter to cure cow-pea hay; the vines, being so large, cure slowly, and with unfavorable weather the hay is apt to be badly injured, if not spoiled, before it is cured enough to stack. The difficulty of harvesting and curing cow-pea hay, its tendency to become woody, and the lower yield per acre, make this crop, for hay production, less valuable than alfalfa where alfalfa can be successfully grown. In certain portions of the state, where difficulty has been experienced in growing alfalfa, cow-peas fill a need by producing hay and pasture of high feeding value. The crop is also especially valuable as a soil fertilizer when used in rotation with other crops or plowed under as green manure.

The cow-pea is sometimes sown in combination with other

crops, such as corn, Kafir-corn, and sorghum for hay. When planted in these combinations there is danger of cow-peas being stunted in growth if the crop with which it is combined is planted too thick. Sown broadcast, cow-peas often make but little growth with these crops, but when planted in rows with corn and cultivated the growth is quite satisfactory.

### **Soiling and Ensilage.**

As a soiling crop cow-peas are very satisfactory. As they should not be planted until the weather and soil are warm, the crop is not available for feed until the latter part of summer, where they fill a place in a well-planned system of soiling and furnish an abundance of succulent green feed, although perhaps less palatable than alfalfa.

When used alone the cow-pea does not make an exceptionally good quality of ensilage, due to the large amount of water in the green vines making a watery silage that keeps poorly and is not well relished by stock. When combined with corn in the proportions of about one-fourth cow-peas to three-fourths corn, it makes an excellent silage that keeps well and is relished by all classes of stock. The combination has greater feeding value than corn silage, for the reason that cow-peas, being relatively high in protein, make the cow-pea-corn silage a more nearly balanced ration.

It is a common practice in dairy sections to grow cow-peas and corn in separate fields and mix them as the silo is being filled. It would seem a more desirable practice to grow the corn and cow-peas together. An experiment along this line was conducted at this Station during 1903, 1904 and 1905, the corn and cow-peas being planted together in rows. When planted the right thickness—corn 12 to 24 inches and peas 4 to 6 inches apart in drill-rows  $3\frac{1}{2}$  feet apart—each grew equally well and produced from ten to fourteen tons of green fodder per acre. The cow-peas twined around the corn-stalks, making the crop easy to harvest with the corn-binder.

### Pasture.

While the cow-pea, because of its general habit of growth, is not a natural pasture plant, few farmers are using it for this purpose. Maturing as it does in the latter part of the summer, the crop furnishes succulent pasture during the time when natural pastures run short. When used with corn to supplement the ration, such pasture can hardly be excelled, especially for hogs and sheep. The stock are usually turned on cow-peas when the crop has reached the stage of maturity considered best for hay, or when some of the pods have begun to turn yellow. Cattle are usually turned on earlier than sheep or hogs; hogs may be pastured on ripe peas. If the stock are turned on the field too early, before the plants have attained full size, there is more waste from the trampling. The plant at this time is more watery and does not furnish its full feeding value. As with many green-pasture crops there is danger of bloat when sheep or cattle are first turned onto cow-peas, yet the danger is far less than with alfalfa, and is lessened as the cow-peas become more mature.

Where cow-peas are to be used for pasture, especially with hogs, it would be preferable to plant with corn. In this way the mixture makes a ration on which hogs do exceptionally well without other grain. When planted with corn for hogging down, the usual method is to plant the same as for ensilage, taking care not to plant the corn so thick as to stunt the growth of the cow-peas. Another method, and one often practiced in pasturing sheep in the more humid climates, is to plant the cow-peas in the corn between the rows at the last cultivation. At this station we have planted cow-peas in corn at the last cultivation for a number of seasons, and they usually make a fair growth if there is sufficient moisture, but when the early fall is dry the cow-peas do not make much growth until the corn is mature. There seems to have been no injurious effect on the corn resulting from this practice, but rather in most seasons the result has been an increased yield of corn in fields in which cow-peas have been planted. Table I gives the comparisons and yields for five years

of corn planted alone and with cow-peas drilled between the rows at the last cultivation.

**Table I.—Yield of Corn per acre, Bushels.**

HOW PLANTED.	1903.	1904.	1905.	1906.	1907.	Average.
Corn alone.....	23.36	56.57	37.80	64.17	38.01	43.98
Corn with cow-peas, planted at last cultivation.....	23.13	67.28	45.98	59.89	41.81	47.62

The average for five years shows that corn in which cow-peas were planted produced 3.64 bushels more grain per acre than corn alone. In 1906, which was relatively dry in August and September, the corn with cow-peas yielded 4.28 bushels per acre less than corn alone. In 1903 the yield was slightly in favor of corn alone. For the other three years the yield was greater where the cow-peas were planted with the corn.

In the drier sections of the state, where fall pasture is needed, it would be better to plant the cow-peas in wheat, oats, or barley stubble rather than in corn. When planted after wheat or oats the cow-peas make a much ranker and more rapid growth, are not checked so severely by a dry fall, and will produce in nearly every instance more fall pasture than could possibly be secured by planting in corn. After pasturing, the cow-peas may be turned under in the fall, leaving the ground in excellent condition for corn the following spring.

#### **Soil Improvement and Green Manuring.**

The growing of cow-peas greatly improves the soil. Being a rank feeder and deep-rooted, the crop is able to use plant-food which the roots of other plants may not secure. Much of this plant-food later becomes available to other crops planted after the rotation with cow-peas. This crop has the advantage over other crops which are not legumes, in that it is able to use the free nitrogen of the air through the aid of the bacteria which live upon its roots. The plowing under of a crop of green cow-peas will greatly increase the supply of humus and nitrogen in the soil, and



even when the crop is harvested for hay or seed increase in soil nitrogen will result from the decay of the roots left in the soil.

In most soils of this state nitrogen is the limiting element of fertility, and anything that will increase the nitrogen supply of the soil will increase the soil's productiveness. The cow-pea, having this ability to secure nitrogen from the atmosphere, not only produces more abundantly than a crop not having this power, but leaves the soil in better condition for crops which follow.

Mr. H. T. Neilson, of the United States Department of Agriculture, in Farmers' Bulletin No. 318, in speaking of the effect of the cow-pea upon the following crops, says: "The increase in yield of wheat due to the cow-peas is generally given as from three to five bushels per acre. At the Missouri Experiment Station, an increase in yield of 63 per cent. with oats and 49 per cent. with wheat following cow-peas as a catch crop was secured. The Arkansas Experiment Station reports, as an average of four years' test with wheat, an increase in yield of 25 per cent. from plowing under cow-pea stubble in the fall, 39 per cent. from plowing under cow-pea vines, and 42 per cent. when cow-peas were grown each year as a catch-crop between the wheat crops, only the stubble of the peas being plowed under."

At this Station we have sown cow-peas as a catch-crop between the wheat crops for the past five years, plowing under the entire growth of peas about the middle of September, two or three weeks before seeding to wheat. The cow-peas have been sown each year soon after wheat harvest, in close drills, at the rate of about one bushel of peas per acre. The field was usually double-disked ahead of the drill. Both plots were plowed on the same date and given similar preparation before seeding. The field used for this work was upland soil low in fertility. The yields for the past five years are given in table II.

Each season the catch crop of cow-peas has given an increased yield of wheat and the effect has been accumulative, the increase in yield being gradual from year to year. The first year of the trial there was a difference of only one bushel in favor of

Table II.—Yield per Acre of Wheat.

TREATMENT.	1904.	1905.	1906.	1907.	1908.	Average.
Wheat continuously. ....	13.40	12.02	13.41	11.79	11.08	12.34
Wheat continuously with cow-peas as catch crop. .	14.49	16.53	15.54	16.37	20.13	16.61

the cow-pea rotation, while after five years the plot which received the green manuring produced nine bushels more wheat per acre, the average difference being four and one-third bushels per acre in favor of planting cow-peas as a catch-crop between crops of wheat. In carrying out this test every effort was made to put the seed-bed in as good condition as possible before the wheat was sown. After plowing, the subsurface packer was used and the seed-bed made as firm as possible.

While the effect of the cow-peas in maintaining the fertility of the soil, where used as a catch-crop with wheat, is clearly shown by this experiment, the practice can hardly be recommended in general farming. In the wheat belt of the central and western parts of the state there is not sufficient moisture to produce a crop of cow-peas for green manuring and still leave the ground in condition for starting the wheat the same fall, except in very favorable seasons. Also, the extra labor involved in preparing a good seed-bed for wheat after cow-peas makes this method unpractical.

A more practical rotation is to plant cow-peas in wheat or oats stubble, plow the crop down before heavy frost in the fall, and follow with corn the next year. A common practice at this Station is to plant the cow-peas during the wheat harvest, following the binder directly with a single-disk drill; or, if the stubble-land is weedy or trashy, it is advisable to disk ahead of the drill behind the binder, thus preparing a more suitable seed-bed. Thus when the harvest is finished the field has been replanted and, if the extra labor can be supplied, this is an economy of time, and the new crop will have all the advantages which may come by timely rains and favorable growing conditions. If it is not possible to plant during the harvest of the grain, then the cow-peas may be sown as soon as possible after the harvest, preferably

disking ahead of the drill between the rows of shocks. Occasionally, by early thrashing, the field may be cleared soon enough to plant the peas, but such planting should not be delayed long after July 1. Planted in this way at this Station, cow-peas have made a growth of twelve to eighteen inches by the last of September, when the crop was plowed under. Such fall-plowed land is in excellent condition for corn the next season, since there is sufficient time between the plowing under of the cow-peas and the planting of corn for the cow-peas to decay and for the moisture to become replenished in the soil. Table III gives the yield of wheat and corn when grown in rotation with cow-peas used as a catch-crop after wheat, as compared with the yields when wheat and corn were grown in rotation without the intermediate green manuring crop of cow-peas.

**Table III.—Yield of Corn per Acre, Bushels.**

	1904.	1905.	1906.	1907.	Average
Following cow-peas used as catch					
after wheat.....	44.89	63.55	65.81	37.76	50.75
Following wheat without cow-peas	32.40	44.89	57.57	32.21	41.77
Yield of wheat per acre, bushels, in rotation with corn, second year after cow-peas:					
	1904.	1905.	1906.	1907.	Average
With cow-peas.....	17.59	22.53	16.58	9.25.	16.49
Without cow-peas.....	17.20	18.67	14.74	9.05.	14.91

These results show that cow-peas used as green manure have had a remarkable effect in increasing the yield of corn, the average annual increase in yield for the four years being nearly nine bushels per acre; also, there was a small increase (about one and a half bushel per acre) in the wheat crop following the corn the second year after the cow-peas were plowed under. The relatively low yield of wheat on all plots is in part due to the unsuitable seed-bed; the wheat was planted in the corn-stalks each fall.

This seems to be a more practical and successful method of using cow-peas for soil improvement than by growing the peas with corn or sowing them as a catch-crop in continuous wheat culture. Also this is a practical way of maintaining the nitrogen

and humus supply of the soil, especially on farms keeping little live stock; but upon a stock farm a green manuring crop should not be expected to replace barn-yard manure but rather to supplement it. Upon stock farms where cow-peas are grown as a catch-crop after wheat or oats for soil improvement it will be found more profitable to pasture the cow-peas rather than to plow the entire crop under. Little of the beneficial effects of the cow-peas is lost by this practice, since by pasturing the droppings of the animals remain upon the field and even when the cow-peas are cut for hay and fed there may be but little loss of fertilizing elements if care is taken to preserve the manure and return it to the land.

#### As a Rotation Crop.

When grown for seed or forage, cow-peas are a valuable crop to use in rotation with other crops. Preferably cow-peas should be used to precede potatoes, corn, Kafir-corn, cane and other rank-growing forage crops, rather than small grains, since in the more favorable seasons, in fertile soil, small grain is apt to lodge when grown after cow-peas. Also, since cow-peas are harvested late, the soil may be left too dry to start fall wheat well. Rotation experiments carried on at this Station for five years with cow-peas or soy-beans and wheat have given the following results:

#### Wheat Rotation with Soy-Beans or Cow-Peas.

Previous crop.	Wheat—yield per acre, bushels.					Av.
	1904.	1905.	1906	1907.	1908.	
Wheat (continuously) .....	17.13	24.40	40.40	37.68	20.53	29.83
Soy-beans or cow-peas (alternate years).....	21.10	26.54	31.10*	38.03	25.16	28.39

Wheat followed soy-beans in 1904-1906, and cow-peas in 1907-1908.

\*Lodged badly, which accounts for lower yield.

The rotation experiments with corn and soy-beans have resulted in increasing the yield of corn after soy-beans, the average annual increase in yield being over fourteen bushels of shelled corn per acre, as an average for four crops. The results are given as follows:

**Corn Rotation with Soy-Beans.**

Previous crop.	1904.	1905.	1906.	1907.	Av.
Corn (continuously).....	48.21	53.00	62.44	45.56	52.30
Soy-beans (alternately).....	58.72	68.26	75.53	63.62	66.53

The straw and stalks invariably made a ranker growth after the cow-peas.

**Seed.**

Cow-peas are an uncertain crop for seed in this state, as the yield of seed varies greatly from year to year, depending upon weather conditions. When the summer is favorable and hot the yield of seed is quite satisfactory, but when the summer is cool or too wet or too dry, the yield is apt to be low. As shown by the trials at this Station, in favorable seasons, good producing varieties have yielded from fifteen to twenty bushels per acre, while in an unfavorable season the same varieties have produced only from five to seven bushels per acre. This uncertainty of a seed crop makes the cow-pea an undesirable crop to grow in a commercial way for seed production, but the value of the crop for soil improvement, pasture, hay and ensilage, and the high price of the seed upon the market, makes it desirable for every farmer to grow enough cow-peas for seed to supply his own needs. At the present price of seed (\$3 per bushel) the average farmer does not feel that he can afford to buy the seed of cow-peas for green manuring, although the expenditure of this amount would doubtless be repaid by the increase in the yield of crops through the increased fertility of the soil. However, if the farmer can raise each year from five to ten acres of cow-peas for seed he will have a supply of seed on hand for his own use, which in favorable seasons will have cost him less than one dollar per bushel to produce, and in unfavorable seasons the cost should not be greater than the average market price of good seed peas.

**Other Uses.**

Besides the uses for cow-peas discussed above there are a few minor uses for which the crop is sometimes grown. In some of the Southern states where cow-peas seed heavily the

seed is grown and used for stock feed. Cow-pea seed has a high feeding value, furnishing about two and a half times as much protein and nearly as much carbohydrates as corn. At the present prices cow-pea seed cannot be profitably grown for feed, but in thrashing more or less of the seed may be broken, making it unfit for planting. Such seed should be ground and fed; mixed with corn-meal or other ground grain it makes especially good feed for hogs or dairy cows. Cow-peas are also used in a small way for human food, prepared in much the same manner as the garden bean.

#### **Cow-Peas Compared With Soy-Beans.**

In some respects the soy-bean would seem to be a more desirable crop than the cow-pea, and in many sections of the country they grow well and are popular. However, in this state (Kansas) they have not proven as sure a crop as cow-peas. The soy-bean as a rule produces more seed than the cow-pea, the seed ripens more nearly at the same time and is easier to save and thrash, while the stalk, growing upright without vining, makes the crop easier to harvest; also, the hay of the soy-bean when properly saved has a little greater feeding value, being richer in protein. In spite of these qualities favorable to the soy-bean, it is surpassed in three respects by the cow-pea, which would seem to make the latter a more desirable crop for this state.

*First*—The stand of cow-peas is more certain than the stand of soy-beans. The seed is more sure of germination, perhaps due to the fact that soy-bean seed is more apt to heat in storage. Also the soy-beans fail to come up well if the soil is crusted, while the cow-peas, being a more vigorous grower, push their way out of heavily crusted soil. This ability of the cow-pea to grow under unfavorable conditions and in poorly prepared seed-bed is very essential, especially when stubbled in after wheat or oats. The soy-beans when sown in this state on land new to the crop usually require inoculation of the soil or seed before they will thrive well, while the cow-pea seems to find its

bacteria in the soil, and will grow well on nearly every soil without inoculation. Rabbits trouble soy-beans more than cow-peas, and this is a very important consideration, especially in western Kansas. These several factors tend to favor a better stand of cow-peas than of soy-beans.

*Second*—Cow-peas are better suited for planting with corn than soy-beans. Cow-peas when planted with corn not only produce more forage than soy-beans, but the vining habit of growth of cow-peas causes them to twine around the corn, so that the vines are held up, which makes the combined crop easier to harvest with a corn-binder.

*Third*—The cow-pea is better adapted for hay than the soy-bean. The leaves of the soy-bean drop quickly as the crop approaches maturity, and it is often difficult to save the hay crop without the loss of a large proportion of the leaves. The leaves of the cow-pea do not drop but remain green and growing after many of the pods are ripe and dry. Again, if the soy-bean is allowed to become a little too mature, not only is there a loss of leaves in curing but the stems become hard and woody and less palatable to stock. On the other hand, soy-beans are somewhat more readily cured and handled for hay, and as pasture for cattle may excel the cow-peas, since the green soy-beans are apparently better relished by stock.

#### Varieties of Cow-Peas.

During the past six years some forty varieties of cow-peas and thirty-five varieties of soy-beans have been tested by the Station for seed and hay production. Some of these varieties have been grown but one year, many of them showing good qualities have been grown two or more years, while the most promising varieties have been grown throughout the six years. Table IV gives the yield of different varieties which have been grown for the entire six years, arranged in the order of hay production.

These varieties, being selected as the most productive from the forty varieties tested, do not show striking variations in

Table IV.—Varieties of Cow-Peas.

Bulletin No.	NAME OF VARIETY.	Days to mature.	Yield per acre.										Av. yield pr acre		
			1903.		1904.		1905.		1906.		1907.		1908.	1903-7	1903-8
			Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	
bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.
118	Mount Olive	114	7.24	1.72	14.96	6.35	11.60	2.05	15.00	1.65	4.86	2.84	1.47	10.73	2.68
65	Whippoorwill	111	6.23	1.38	14.25	6.25	16.52	2.79	12.77	1.76	7.54	1.98	1.59	11.46	2.63
271	Gray Goose or Taylor	113	2.74	2.12	23.31	3.32	15.87	2.78	15.62	2.54	1.78	2.21	1.85	11.86	2.47
202	Hammond's Black	114	6.10	1.84	17.73	2.78	16.03	2.05	8.32	2.49	7.46	2.27	1.97	11.13	2.23
277	Black Eye	111	8.00	1.66	19.78	3.28	16.3	2.05	12.37	2.68	7.05	1.40	1.97	12.71	2.17
183	New Era	107	11.07	.86	18.86	3.75	12.03	2.57	15.62	2.14	4.62	2.53	.97	12.44	2.14
188	Michigan Favorite	107	7.62	1.16	17.94	2.80	12.40	3.14	14.40	1.85	3.81	1.88	1.75	11.23	2.10
274	Warren's New Hybrid	107	6.56	1.78	21.11	3.45	12.76	2.13	18.85	1.50	8.02	2.13	1.37	13.46	2.06
270	Old Man's	108	9.10	1.82	20.97	2.90	12.91	2.17	9.12	1.86	5.35	2.38	1.05	11.49	2.03
121	White Giant	108	8.62	1.22	17.57	4.88	16.42	1.45	9.33	1.16	2.11	1.73	1.23	10.81	1.95
279	Clay	108	1.09	1.97	15.04	3.17	13.85	.....	15.20	1.53	8.10	1.59	1.45	10.86	1.94
273	Warrens Extra Early	107	4.21	1.40	17.72	3.15	10.06	1.97	18.45	2.37	3.57	1.45	.87	10.80	1.87

Varieties of soy-beans.

Bulletin No.	NAME OF VARIETY.	Days to mature.	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain	Hay
			bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.	bu.	tons.
343	Early Yellow	99	14.80	.....	20.10	1.96	10.18	1.69	13.18	3.01	5.59	1.54	1.31	1.31	12.77	1.90
326	Ito San	102	14.80	.....	16.53	1.77	10.13	1.58	13.68	1.85	10.59	2.34	1.54	1.54	13.15	1.81
335	Small Yellow	109	15.80	.....	16.89	1.95	16.38	1.09	14.80	2.29	9.61	1.67	1.61	1.61	14.71	1.72
333	Green Samarow	105	14.50	.....	13.59	1.94	11.67	1.09	12.98	1.75	.....	1.28	.99	.99	13.18	1.41





A MILK DELIVERY WAGON IN ROTTERDAM.

Photographed by Prof. E. H. Farrington.

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yield. The Mount Olive ranks first, having produced an average of 2.68 tons of hay per acre for the six years, and Whippoorwill second, having produced an average of 2.63 tons of hay per acre. In the production of seed for an average of five years, 1903 to 1907, inclusive, the Warren's New Hybrid has produced the largest yield, 13.46 bushels per acre; Black Eye second, 12.71 bushels, and New Era third, 12.44 bushels.

For the production of cow-pea seed four characteristics are especially desirable, namely, yield, evenness of ripening, early maturity, and an upright habit of growth. The New Era seems to have these characteristics the most highly developed. It is a good yielder of both hay and seed; is as early and as evenly maturing as any good variety, ripening in 107 days; and has the most upright habit of growth of any of the varieties reported, thus making it the most easily harvested. Mount Olive, which leads in hay production, matures later and produces less seed. Hammond's Black, also a good hay producer, cannot be depended upon to mature seed. The Whippoorwill is a little late in maturing, but it is a high-yielding variety and is especially adapted for growing with corn for ensilage, as it has a twining habit of growth and ripens well with varieties of corn like Silvermine, Boone County White, Legal Tender and Reid's Yellow Dent. White Grant cannot be recommended, since it is troubled greatly by blight, which often nearly ruins the crop. Judging from these tests the following varieties may be recommended for growing in this state: For seed, Black Eye, New Era, Warren's New Hybrid; for hay, Whippoorwill; for catch-crop after wheat, New Era.

The following varieties of cow-peas have been grown one or more years at this Station, but for various reasons have not proven so well adapted to our conditions as other varieties named above: Extra Early, Unknown or Wonderful, Iron, Black, Red Unknown, California, Red River, Yellow Sugar, Chowder, Extra Early Black Eye, Large Black Eye, and Lady or Galivant. The following varieties of soy-beans have also been tested one or more years: Green, Medium Green, Olive

Medium, Ogema, Extra Early Black, Early Green, Flat Black, Early Black, Medium Early, Green, Yellow, Southern, Large Yellow, Late Yellow, Medium Yellow, Green Black, and Large Medium Late Yellow.

#### Culture of Cow-Peas.

There is no more metropolitan crop grown in the corn belt than the cow-pea. It will grow and make profitable crops on nearly every type of soil in the state of Kansas when supplied with the necessary amount of moisture and given good culture. The plant is better adapted to the open soils of a sandy loam nature rather than to the clay loams or heavy clays. These more open soils allow good aeration, which favors bacterial activity and thus promotes a better development of the plant. The heavy clay soil produces but a small crop the first year, but the second year the crop grows better, which probably results from the soil being opened and enlivened by the deep root system of this plant. The deep rooting of the cow-pea in soils of this character puts these soils in better condition for all classes of crops which may follow the cow-peas.

The cow-pea is everywhere recognized as a rank feeder, being able to extract plant-food from soils almost barren to other crops, thus making it well adapted for growing on "worn-out" soils as a soil renewer. It has an especial advantage over some other leguminous crops in being able to grow from the start upon new land without inoculation with the bacteria which live upon its roots and which aid it in securing nitrogen from the atmosphere. Whether these bacteria are always present in sufficient numbers in soils new to the crop, or whether the bacteria adhere to the seeds and are thus carried to the soil with the seed, has not been proven. Tubercles may nearly always be found upon the roots of cow-pea plants the first season the crop is grown on new land. This habit gives the cow-pea an advantage over the soy-bean, since new fields must usually be inoculated with the soy-bean bacteria before the crop will thrive. Also, the presence of these nitrogen-gathering bac-

teria is required in order that the legume crop may store nitrogen and improve the fertility of the soil.

A soil of medium fertility is considered best for the production of cow-peas. On poor soil the plants produce a light yield of hay, although often seeding well. Upon a very fertile soil there is apt to be an excessive growth of vines which fail to produce seed well and which are difficult to cure for hay. Cow-peas, like other legumes, will not grow well in a wet soil; nor are they particularly well adapted for dry farming, unless given very careful culture. They will grow wherever corn will grow successfully. For the drier portions of the state the earlier-ripening varieties are to be preferred.

#### **Preparation of Soil.**

While the cow-pea will grow upon a poorly prepared seed-bed it responds to good cultural methods. The seed-bed for cow-peas should receive as careful preparation as the seed-bed for corn. Although cow-peas are necessarily planted late in the spring, it is often desirable to plow the ground early and cultivate the field at intervals with the disk or harrow to destroy weeds and maintain a soil mulch to receive and retain the moisture. It is advisable to plow in the fall or winter certain types of heavy soil not inclined to drift, or land which has no cover of stubble or stalks. Such land may be disked and harrowed in the spring to clear it of weeds and put it in good condition for planting.

When seeded as a catch-crop after wheat or other small grain, the most practical method is to prepare a seed-bed with the disk-harrow, or to seed with a single-disk drill without previous cultivation, if the ground is clean and mellow. Plowing the ground at this time would put it in condition to hold more moisture and might give a greater growth and a more perfect stand of peas, but in order to plow wheat or oat stubble it would often be necessary to wait until after thrashing, which in most instances would mean planting too late to insure a good stand and good growth of cow-peas. Unless the stubble is

disked behind the binder the amount of moisture lost before plowing would often more than offset the gain from a mellow condition of the surface soil secured by plowing. In planting cow-peas after small grain as a catch-crop at this Station, we have found it advisable to follow the binder immediately with the disk-harrow and the disk-harrow immediately with disk-drill. This practice means a rush of work, but by this method the work of seeding does not interfere with the shocking of the grain and the peas are planted at the earliest possible date. The crop so planted has every advantage of rainfall and favorable conditions for growth. The moist, mellow condition of the soil usual at harvest time insures a rapid germination of the peas, while if the preparation and planting is delayed a few days the ground is apt to dry out and become hard. This practice can only be followed upon reasonably clean stubble land.

#### **Methods of Planting.**

The method of planting cow-peas will depend upon the purpose for which the crop is grown. For the production of seed, the best practice is to plant in rows about three feet apart, dropping the peas in the rows two or three inches apart. A common corn-planter may be used for this purpose, but the rows will be farther apart than is necessary for the greatest production of peas. With the edge-drop planter, it is necessary to use the sixteen-cell plate and the highest gear in order to drop the peas thick enough. Some farmers use the corn-planter with the drill attachment, straddling each alternate row, which makes the rows from twenty to twenty-two inches apart. If this method is followed the peas should be placed about six inches apart in the row. Rows placed too close together are inconvenient for cultivating. A good method of planting practiced at this Station is to use a common grain-drill which will not split the peas (there is a difference in drills in this respect), stopping up part of the grain cups so as to leave the rows about three feet apart, setting the drill to sow

about two bushels of wheat per acre. This rate of seeding drops the peas about two to four inches apart in the row and requires ten to twelve quarts of peas to seed an acre. The peas should be planted two to three inches deep in mellow soil.

The usual practice is to surface-plant cow-peas. They may, however, be successfully planted in furrows, either by listing or preferably by the use of the furrow-opener on the corn-planter. At this Station the usual plan is to plant with the furrow-openers. There may be advantage from furrow planting by getting the peas deeper in dry soil. In early cultivation the weeds are more readily destroyed by covering them as the furrow is filled. If cow-peas are listed care should be taken not to list over four or five inches deep. The plants start slowly in a deep-listed furrow and usually make a poor stand and a dwarf growth.

When the cow-peas are planted for hay or green manuring, the best method is to sow broadcast or in drills six to eight inches apart. For planting in this manner the grain-drill will prove the most satisfactory implement, and should be set to sow about six pecks of wheat per acre, which will sow the peas at the rate of a bushel to one and a half bushels per acre. Planting in close drills does not require later inter-culture. The peas do not vine so much, grow more upright, are easy to harvest with the mower, and make a less woody hay.

When planted for ensilage with corn the most successful method is that of planting the corn and cow-peas at one operation. The common two-row corn-planter, with the sixteen-cell edge-drop plate, in which the notches have been filed out to make the cells as large as possible, may be used. The cow-peas and corn should be mixed about half and half by weight and the planter set with the drill attachment to plant as thickly as possible. This gives the proper stand of the combination crop, corn averaging about eighteen inches apart and cow-peas four to six inches apart in the drill-rows. If the corn is planted much thicker than suggested a rank growth of stalk is apt to smother the cow-peas, while if the corn is too thin the

stalks fail to support the cow-pea vines, making the crop difficult to harvest.

When cow-peas are sown in corn at the last cultivation the usual method is to sow with the one-horse wheat-drill, planting two or three rows of peas between the rows of corn. A common practice also is to sow the peas broadcast in the corn at the last cultivation and cover them with the cultivator. This method is not so satisfactory, on account of the unevenness of the depth of covering and the consequent poorer stand of peas which may result.

#### **Time Planting.**

Cow-peas, being a southern crop, are naturally sensitive to cold. When planted in cold, wet soil, the seed will either rot or the plants will make a poor, sickly growth. Cow peas should not be planted until the soil has thoroughly warmed up and not until all danger of periods of cold weather has passed. Cold spells shortly after planting will often cause a poor stand of the peas. The time of planting will depend largely upon the purpose for which the peas are grown. For green manuring they may be sown as late as the last of July and will make a considerable growth of green material to be plowed under before frost, but if planted for hay or seed it is necessary to sow earlier. In order to determine the most satisfactory date at which to plant cow-peas, an experiment was started in 1904, planting cow-peas at different dates. This experiment was continued through 1905 and 1906. The results are shown in table V.

In this experiment the New Era, one of the earliest maturing varieties of cow-peas, was planted. Since the dates of planting in 1904 do not exactly correspond with those of 1905 and 1906, the yields of the 1904 crop have not been used in determining the average. Taking the average yields for 1905 and 1906, we find that planting June 9 has given the highest yield of grain, and planting June 3 has given the largest production of hay. In 1904 the greatest yield of hay was produced from the June 3 planting, but for this season the later



**Table V.—Date to Plant Cow-Peas—A Summary of Results for Three Seasons, 1904, 1905, 1906.**

DATE PLANTED.	Yield per acre.						Average yield per acre for two years' trial, 1905-1906.	
	1904.		1905		1906.			
	Hay	Grain	Hay	Grain	Hay	Grain	Hay	Grain
	<i>tons.</i>	<i>bu.</i>	<i>tons.</i>	<i>bu.</i>	<i>tons.</i>	<i>bu.</i>	<i>tons.</i>	<i>bu.</i>
May 12.....			0.87	3.93	1.51	10.39	1.19	7.16
May 19.....	2.01	15.92	1.61	7.77	2.39	12.88	2.00	10.32
May 26.....	3.55	17.93	1.85	8.98	2.15	10.85	2.00	9.91
June 3.....	4.00	19.90	2.32	11.20	2.20	10.14	2.26	10.68
June 9.....			2.57	12.03	1.60	11.15	2.08	11.59
June 16.....	3.76	23.81	1.82	5.85	1.73	6.08	1.77	5.96
June 28.....	2.23	22.89	1.21	5.75*	1.00	3.20	1.10	4.47
July 14.....	1.92	0.06*	.....	.....	.....	.....	.....	.....

\*Injured by frost.

seedings of June 16 and 28 gave the largest production of grain. In 1905 the June 28 planting was injured by frost and in 1904 the July 14 planting was killed by frost, so that no seed matured. This experiment shows that it would not be a safe practice to plant New Era cow-peas for seed later than the 25th of June, and that the best results year after year will probably be obtained by planting from the 25th of May to the 10th of June. For the largest production of hay the cow-peas should be planted a week earlier. The early planting of the peas usually causes a heavy growth of vine and a decreased production of seed. It is a safe practice not to plant until about two to three weeks after the regular corn-planting time.

When planting cow-peas with corn for ensilage our experiments at this Station indicate that the best time for planting the combination crop is about the first week in June. If planted earlier than this, when the soil is cold, the cow-peas start slowly and are thus apt to be covered and destroyed by the early cultivation of the corn, or the corn, starting more rapidly, outgrows the cow-peas which make only a dwarf growth. If, however, the ground is permitted to warm up

before the combined crop is planted, the corn and cow-peas start together and grow equally well.

#### Cultivation.

If the soil is sufficiently warm when the cow-peas are planted the plants will start quickly and grow rapidly. When planted in rows for seed, the crop may be cultivated in two or three weeks after planting. Unlike corn, the young cow-pea plants are tender and should not be cultivated with the weeder or harrow; at least not until the plants have made some growth and are not so easily broken. If the peas are planted in furrows the crop may be harrowed during its early growth without injury to the young plants. It sometimes happens that a heavy rainfall soon after the seeding of cow-peas causes the soil to become crusted, making it difficult for the young plants to push their way out. In this condition a harrow may be used to advantage to break the crust without much danger of injury to the sprouting plants.

When cow-peas are sown broadcast they require little or no cultivation after they are out of the ground. If the ground was well cultivated and cleaned of weeds previous to seeding, the young plants with favorable weather grow rapidly and will usually smother any weeds which may start after the planting. When planted in rows the crop should be cultivated in about the same manner as corn. Three cultivations with the cultivator are usually all that are required. It is perhaps preferable to cultivate the first time with the knife or Acme cultivator, which may be run close to the row without much danger of covering the plants. For the second and third cultivation, the six-shovel cultivator is preferred. For seed production, cow-peas should be cultivated the last time just before blooming. Very little is gained by later cultivation, as it causes greater vining of the plant and thus later maturity.

## HARVESTING COW-PEAS.

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### For Hay.

Cow-peas should be cut for hay when most of the pods are developed and when the first pods and some leaves begin to turn yellow. At this stage the plant has attained its growth and none of the leaves have been lost. If cut before maturity the vines are watery and difficult to cure, while if left too late before cutting there will be an unnecessary loss of leaves in handling and the stems will be tougher and more woody. Cow-pea hay should be handled in curing in about the same manner as alfalfa, but it cures more slowly than alfalfa. A good practice is to begin cutting in the morning as soon as the dew is off when the indications are for favorable weather for a number of days. Before the leaves have become very dry the hay should be raked and allowed to cure in the windrow a short time. It should then be placed in cocks of moderate size, made as high in proportion to circumference as possible. The cocked hay should be allowed to remain in the field for three or four days until the stems of the peas are well cured, when the hay may be mowed or stacked. Where possible, cow-pea hay should be stored under shelter. The coarse nature of the forage makes it hard to keep in the stack, since it does not shed water readily.

### For Ensilage.

When sown alone cow-peas should be harvested for ensilage at about the same stage of maturity as for hay. They should be cut only a short time before they are hauled to the silo; should be raked green, placed in small bunches or loaded onto the wagons directly from the windrow. When cow-peas are planted with corn for ensilage, the combined crop may be harvested with the corn-binder and handled in the same manner and as easily as corn planted alone for ensilage.

**For Seed.**

Cow-peas ripen so unevenly that it is difficult to judge at just what stage of maturity to cut for seed. With most varieties blossoms, green pods and ripe peas occur at the same time, and this condition continues usually until frost. Harvest before a heavy frost or when most of the pods are brown and the larger proportion of the peas are ripe.

In some of the Southern states, where labor is cheaper, the peas are picked by hand for seed as they ripen. On account of the scarcity of labor in this state this method is hardly practical, although where labor can be secured peas may be picked by hand and thrashed for about one dollar a bushel.

There are several makes of bean and pea-picking machines manufactured and sold upon the market today, but they are not extensively used and it is doubtful if they could be successfully used in this climate, where the peas could not be allowed to complete ripening before picking. A method of harvesting cow-peas for seed is to pull the vines by hand, place in small shocks, and leave in the field until well cured. The peas may be thrashed directly as hauled from the field, or they may be stacked and thrashed later. The vines often pull hard, thus it is the practice at this Station to cut them with a straight corn-knife. This method of harvesting is slow and may not be practical where the peas are raised on a large scale, but upon a small scale it is the most satisfactory method. A man should harvest and shock by hand about one-half acre of peas in a day.

The difficulty in harvesting cow-peas by machinery is due to the twining habit of the plant, which causes it to run and entwine together from row to row. The mowing-machine with vine-lifters attached to the guards may be used in harvesting the cow-peas for seed, but one objection to the mowing-machine lies in the fact that the machine and horses have to pass over the peas while in the swath, which shells them badly. To avoid this a bunching or windrowing attachment has been manufactured to attach to the cutter-bar of the mowing-machine, which lifts the cow-peas as they are cut off by the mower and

carries them to one side, leaving them directly behind and out of the way of the mower on the next round. If a rolling-colt is used on the end of the cutter-bar to cut off the vines that entwine with the vines of the uncut row, this attachment may give satisfactory results, although the attachment is heavy and is hard upon the mowing-machine upon which it is used. The self-rake reaper has been used in harvesting peas for seed, and is quite satisfactory.

There are several types of bean-harvesters manufactured which are sometimes used in harvesting cow-peas. The most successful of these harvesters are constructed so that two long knives run under the vines cutting off the stems of the peas beneath the surface of the ground. These machines will harvest two rows of peas at a time and leave the vines thrown together in one windrow. With this harvester it is necessary to have rolling-colters placed outside the knives to cut off the vines to prevent them dragging and clogging the machine. This machine has proven very satisfactory for harvesting soybeans, but the cow-peas clog some, and the horses walking ahead of the machine, although walking between the rows, trample some of the vines and shell the peas. When cut with the bean-harvester the peas are thrown into a fair-sized windrow, where they may be allowed to partially cure. One day in the windrow is usually sufficient. The peas should then be placed in shocks and allowed to thoroughly cure. Three or four days of good drying weather will usually cure them sufficiently in the shock so that they can be mowed or stacked. Since cow-pea hay takes water very easily, the stacks should be provided with some form of covering. The usual covering, and one that is very satisfactory, is wild grass or prairie hay.

#### **Thrashing Cow-Peas.**

When a few acres of cow-peas are grown for seed the most satisfactory method of thrashing is with the flail. This method is slow, yet one man can flail out about an acre of peas in a day, and the work may be done when other work on the farm is

slack. Flailing out cow-peas will cost about eight to ten cents per bushel when the seed crop is good, and may cost as much as twenty-five cents when the crop is poor. Cow-pea hullers are manufactured and sold upon the market at prices ranging from \$300 to \$600, exclusive of the engine. These hullers are reported as doing satisfactory work, although none have been tried at this Station. When enough cow-peas are raised in a neighborhood to justify the purchase of a huller this is undoubtedly the most satisfactory method of thrashing, and when peas are stacked or stored in the barn one machine should be able to thrash 1,500 to 2,000 acres in a season.

The common thrashing-machine is sometimes used for thrashing cow-peas, but unless adjustments are made to adapt it to thrashing cow-peas it will split more than half of the peas, ruining them for seed. Different thrashing-machine companies make attachments for the common grain-separator to adjust it for thrashing peas and beans, but the trials of such attachments at this Station have not proven successful; either the cow-peas were not thrashed clean or else the seed was badly broken.

Our farm foreman, Mr. Floyd Howard, has made adjustments to the bean-thrasher attachment for the Avery separator so that we were able to thrash cow-peas this past season fairly clean and with no more cracking of the peas than would occur by flailing. Determinations of cracked peas of average samples of the different varieties as they came from the separator showed that the percentage of peas cracked ranged from 3 to 12 per cent. The varieties having the largest sized seed, like the Gray Goose, were cracked the most, while the varieties having smaller seed, like the New Era and Whippoorwill, were cracked the least.

The attachment adjusting the Avery separator for thrashing cow-peas reduces the speed of the cylinder and at the same time maintains the speed of the rest of the machine. To accomplish this the speed of the engine is reduced so as to turn the cylinder at the rate of 500 revolutions per minute (the

usual rate for thrashing wheat and oats being from 1,000 to 1,200 revolutions per minute.) In order not to reduce the rate of movement of the rest of the machine it is necessary to increase the size of the pulleys that run the feeder, fanning riddles, cleaning pans, wind stacker, etc. The pulleys were changed as follows: Feeder, from  $5\frac{1}{2}$  inches to 12 inches; crank-shaft, which runs the riddles, shaker, grain pan, etc., from  $5\frac{1}{2}$  to 12 inches; wind stacker, from 7 to 12 inches. By these adjustments the speed of the separator, except the cylinder, was maintained. All of the cylinder teeth and two rows of concaves were left in the machine, for when any of these were taken out the peas were not thrashed clean. The above changes are included in the regular attachment furnished by the company. It was found, however, that the peas were split badly with the machine thus adjusted, and we were not able to do satisfactory work until Mr. Howard observed that most of the peas were cracked in passing through the grating of iron bars directly behind the cylinder. This grating was removed and replaced by No. 8 wire strung from two to three inches apart and attached at the top and bottom to the bars that originally held the grating. With this adjustment we are able to thrash cow-peas successfully with our Avery separator.

#### Storing Cow-Pea Seed.

Cow-pea seed can be stored for considerable time in this climate without much danger of loss of vitality. The soy-bean is difficult to keep in storage in large quantities, as the seed frequently heats badly. However, this is not the case with the cow-pea, and there is little danger of heating if the peas are sufficiently cured in the mow or stack before thrashing. Cow-pea seed, however, is subject to attack from insects, and especially from the cow-pea weevil, a beetle dark brown in color and about one-fifth of an inch long, that lays its eggs upon the newly-formed pods in the field. These eggs hatch and the larva eats through the pod and enters the nearest pea. The insect usually lives within the pea until after the pea is thrashed and

placed in storage, when with a suitably warm temperature it comes out of the pea as a mature beetle and lays its eggs upon other stored seed. These eggs soon hatch and produce other larvæ, which cause further destruction of the peas. There may be several generations of these beetles in a single year, so that, unless precautions are taken to destroy the insect as soon as possible after the peas are placed in storage, a large proportion, if not all, of the peas may be infested. Peas infested with weevil can readily be discovered by throwing them lightly into water, when the infested peas will float.

Dr. T. J. Headlee, entomologist of this Station, in speaking of the pea weevil, says that these insects are so easily kept under control that no grower should lose a large amount of seed as a result of their work. He recommends as a preventive measure that the infected seed peas be treated with carbon bisulfid as soon as placed in storage, followed with a second treatment two or three weeks later, when any eggs not hatched at the time of the first treatment will have hatched and may thus be destroyed.

Carbon bisulfid costs about twenty cents a pound, and that amount is sufficient to treat about 500 cubic feet of peas. The treatment is easily made if the peas are stored in bins as nearly air-tight on sides and bottom as possible. The carbon bisulfid should be placed in a dish on top of the seed, where it will evaporate, and, being heavier than air, will sink into the mass of the seed, destroying any insects present. The gas diffuses equally in all directions through the seed and the quantity of carbon bisulfid to be used must be determined by the total size of the bin. There is no danger of using too much of the liquid. A canvas covering may be thrown over the surface of the peas to insure a more perfect confinement of the gas during the treatment.

*Caution.*—Great care is necessary in using carbon bisulfid. It is a highly inflammable gas, and no fire of any nature should be allowed in the building where the gas is being used. Care must be taken not to enter the building with a lighted lantern,



pipe or cigar until after the building has been thoroughly aired. It is usually best to fumigate seeds with carbon bisulfid in a granary or shed removed some distance from other large buildings, but with proper precautions the fumigating may be done in any building.

### Summary.

1. The cow-pea is a leguminous crop enabled by the bacteria that live upon its roots to make use of the nitrogen of the atmosphere and store it in the soil for the use of non-leguminous crops like wheat and corn.

2. Cow-peas make nutritious hay relished by nearly all classes of stock, but the plant is a rank grower and the hay is somewhat difficult to cure.

3. Cow-peas planted with corn make ensilage of higher feeding value than corn alone, being richer in protein. Cow-peas planted with corn produce as much ensilage per acre as may be produced by corn alone.

4. Cow-peas planted with corn at the last cultivation increased the yield of corn in which the cow-peas were planted by more than three and one-half bushels per acre as an average for five years.

5. Cow-peas planted as a catch-crop between crops of wheat in continuous wheat growing increased the yield of wheat four and one-third bushels per acre as an average for five years. Where cow-peas were used the yield of wheat has continually increased. Where not used the yield of wheat has continually decreased.

6. Cow-peas used as a catch-crop after wheat in rotation of wheat and corn increased the yield of corn over nine bushels per acre as an average for four years.

7. Cow-peas have proven a better crop than soy-beans. They are more sure of making a stand, make a ranker growth and larger yield of forage, and are better suited for planting with corn for ensilage and for green manuring than soy-beans.

8. The following varieties of cow-peas have given the best results: For hay, Whippoorwill, Mount Olive, New Era, and Gray Goose; for ensilage, Whippoorwill; for a catch-crop after wheat, New Era.

9. Cow-peas will grow upon a poorly prepared seed-bed, but they respond to good cultural methods, and a seed-bed for cow-peas should be prepared as carefully as a seed-bed for corn.

10. When sown broadcast or in close drills cow-peas do not require cultivation, but when sown in rows for seed they should be cultivated in about the same manner as corn. Nothing is gained by cultivating cow-peas after the blooming period for seed production, since the late cultivation produces a more vining growth and delays maturity.

11. The best method of planting cow-peas is with a common grain-drill, letting all seed-cups run when planting for hay and stopping up enough of the cups to plant in rows about three feet apart when planting for seed.

12. The best time for planting cow-peas in central Kansas is from May 25 to June 10 for seed, and about one week earlier than this for hay. When planting with corn for ensilage the combined crop planted about June 1 has given the best results.

13. Cow-peas should be cut for hay when the first pods and some of the leaves are turning yellow. For seed the crop should be cut when most of the pods are mature.

14. Cow-peas can be harvested for seed, in a small way, by hand; but when grown in large areas the bean-harvester and cow-pea attachment to the mowing-machine may be used.

15. With the flail is the most satisfactory way of thrashing cow-peas unless they are grown in areas large enough to justify the purchase of a pea-huller or a cow-pea attachment to the grain-separator.

166. The cow-pea weevil which attacks cow-peas in storage can be held in check by treating the stored peas with carbon bisulfid.

## MODERN SILO CONSTRUCTION.

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By

J. B. Davidson and M. L. King, and Published by Iowa Station.

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The importance and value of the silo in furnishing succulent food for dairy cows and other farm animals is now being more generally appreciated. Only a trial is necessary to convince stock raisers in the corn belt that silage is an economical feed for the production of beef as well as for the production of milk. Silage when included in the ration for steers makes it more palatable, and in this manner is an active agent in bringing about more rapid gains. Also, in many cases well preserved silage has been found a cheap and successful feed for sheep, swine and horses.

The silo may be made an ornament to any group of farm buildings. Its form is such that it may be made to add to the appearance of any style of construction. One or more conical silo roofs when viewed from a distance; or the full height of the curved walls at a closer range, gives a very pleasing effect when placed in a setting of rectangular buildings. This impression is entirely independent of the great value of silage as a feed and is pleasing to such a degree that a prospective purchaser, in making a close decision, would be influenced to a far greater extent than the original cost of the silo.

### The Location of the Silo.

Of the silos reported by their owners or visited, 135 were located outside of the barn and 26 inside. Those located inside of a building were largely of a type not well adapted to be placed outside. These reports indicate that a location of the

silo outside of all buildings meets with greater favor among those using silos. There are good reasons for this. First: the silo with the exception of a few types, is of such a construction that it does not need the protection of a covered building. Second: it is not economical to place a silo in a building where it will occupy space which may be put to other use. Third: a silo located inside of a building is often unhandy to fill. The forage cannot be delivered to the cutter conveniently. Fourth: by locating a silo outside of the building and only connecting it thereto with a passage provided with doors, the objectionable odor of the silage may be kept out of the building. By arranging the silo so as to be connected to the feeding room with a feed way, it should be as convenient for feeding as when located in the building itself. A very common arrangement is to so locate the silo that the passage-way from silo to barn is a continuation of the feed-way in the barn. In general, it seems that there are few advantages in building a silo inside of a building and many in building it outside. There are types of barns, the large round barn, for instance, which are of a form making it possible for a silo to be conveniently located at the center.

#### **Essentials of Construction.**

The fundamental principle in the preservation of green forage when placed in a silo is the exclusion of air. It is the purpose of any silo regardless of its construction to exclude air as far as possible from the silage and in this way prevent decay. To prevent the air from reaching the silage all silos must have air-tight walls. These must be rigid enough not to be sprung out of shape by the pressure of the silage, permitting air to enter next to the wall. Not only the walls but the doors also, must be perfectly air tight. To accomplish this, they should be well fitted and the joints made more perfect by felt pads or gaskets. It is good practice where the silo door sets against a shoulder, to place clay worked into the consistency of putty in the joint. The clay is placed on the bearing

surface and the door placed over it and when the pressure of the silage comes against the door an air-tight joint is obtained. Tar paper is successfully used by some silo owners either in strips to cover the cracks around the doors or in widths sufficient to cover the entire door and lap a few inches on the silo walls.

In addition to being air-tight, the silo wall must prevent the loss of moisture from the silage. Porous walls, which sap the juices from the silage and transfer the moisture to the outside of the wall where it will be evaporated, cause the silage to become dry and moldy for a considerable distance inward. If porous material is used for the wall, some provision must be made for sealing it and making it water tight. In masonry silos a plaster coat of rich mortar may be used successfully. A cement wash will often be just as satisfactory, and a coat of coal tar has been used successfully in the same way. Concrete silos have been known to preserve the silage more perfectly after two or three fillings, a fact which may be accounted for by a gradual sealing of the walls by material from the silage.

Not only should the walls be tight and rigid, but they should also be perfectly smooth on the inside to permit the silage to settle without forming air pockets, which cause a certain amount of the adjoining silage to rot. The foundation wall, and in fact the walls of the entire silo, should be as smooth as possible. If due care is used in tramping the silage during the filling, doors which extend into the silo are not a serious objection, though perfectly flush doors are certainly an advantage. A vertical wall is the only satisfactory wall to use, as a wall inclined outward will support the silage to a certain extent and prevent it settling satisfactorily, thus creating air pockets. When the wall is inclined inward the silage will settle away from it. In the case of concrete silos with tapered walls, these should be vertical on the inside.

The quality of silage improves as the depth increases, due to the weight above. The usual silo today is 30 or more feet

deep. A larger percentage of mouldy and otherwise inferior silage is found near the top of a silo than at the center or near the bottom, proving that a certain weight is necessary to compress the silage and exclude the air so as to insure its perfect preservation. By building a deep silo a greater percentage of good silage is obtained, which is, of course, a matter of economy. Good practice at present seems to indicate that the depth should be at least 30 feet. Some limitation in height may be necessary in silos of light construction on account of the wind or the strength of the walls to resist crumpling, but in masonry silos greater height than the average is advisable. A large percentage of good silos are built considerably deeper, even 50 to 60 feet. In the discussion of foundations, it is stated that they should extend below the frost line. If the earth inside the foundation wall is excavated to this depth and the floor placed on a level with the footings, a very cheap addition to the silo is secured without increasing the height of the silo above the ground. Beyond a certain depth the difficulty in removing the silage is so great as to more than balance the economy of securing additional space in this way. Three or four feet up to the first door is not considered objectionable.

The capacity of a silo varies as the square of the diameter, while the wall surface varies directly as the diameter. This means that as far as capacity is concerned the silo should be of as large diameter as possible. But there are other limiting factors involved. When silage is left exposed to the air for a short time, more than a day, it spoils. Enough must be removed daily so that it will keep fresh. In well settled silage, the air does not penetrate much over an inch, and if  $1\frac{1}{2}$  to 2 inches are fed from the surface daily the silage will remain fresh. In warm weather the spoiling will take place much more rapidly than in cold weather, requiring that silage be removed from the surface to a greater depth each day in order to keep it fresh. It has been noticed also that air penetrates into loose, dry silage farther than it does into that which is moist and compact. Thus, it is seen that under some cir-

Table I.—Capacity of Round Silos.

Inside Diameter	Height	Capacity Tons	Acreage to fill 15 tons to the acre	Amount that should be fed daily. Pounds
10	28	42	2.8	525
10	30	47	3.	525
10	32	51	3.4	515
10	34	56	3.7	525
10	38	65	4.3	525
10	40	70	4 6	625
12	28	61	4.1	755
12	30	67	4.5	755
12	32	74	5.0	755
12	34	80	5.3	755
12	36	87	5.8	755
12	38	94	6.4	755
12	40	101	7.3	755
14	28	83	5.5	1030
14	30	91	6.1	1030
14	32	100	6.7	1030
14	34	109	7.2	1030
14	36	118	7.9	1030
14	38	128	8.5	1030
14	40	138	9.2	1030
16	28	108	7.2	1340
16	30	119	8.0	1340
16	32	131	8.7	1340
16	34	143	9.5	1340
16	36	155	10.3	1340
16	38	167	11.1	1340
16	40	180	12.0	1340
18	30	151	10.	1700
18	32	166	11.	1700
18	34	181	12.	1700
18	36	196	13.2	1700
18	38	212	14.1	1700
18	40	229	15.26	1700
18	42	246	16.4	1700
18	44	264	17.6	1700
18	46	282	18.8	1700
20	30	187	12.5	2100
20	32	205	13.6	2100
20	34	224	15.0	2100
20	36	243	16.2	2100
20	40	281	18.8	2100
20	42	300	20.	2100
20	44	320	21.3	2100
20	46	340	22.6	2100
20	48	361	24.	2100
20	50	382	25.5	2100

cumstances an inch might be sufficient, but in order to have fresh silage under all circumstances the silo should be of such size that approximately two inches will be fed from the surface each day. After silage has been placed in the silo there is more or less settling, the amount of which will depend on the condition of the silage and the amount of tramping it is given when the silo is filled. Under average conditions, the settling will amount to about one-sixth or one-fifth of the total depth. Where one silo is used, it should be of such a depth to provide silage for the feeding season by removing the necessary amount each day. Thus if the silo has thirty feet of silage in it after settling, it will provide silage for 180 days or six months by removing two inches from the surface each day.

Table I, preceding page, gives the capacity of various sizes of round silos and the amount which must be fed daily to lower the surface about two inches per day. This table of capacities is based upon the observation of Professor F. H. King, of Wisconsin, and assumes that the silage is made of well matured corn and that after the silo has been filled and allowed to settle for two days, it is refilled to the top. The amount which should be fed daily is based upon an average weight of 40 pounds per cubic foot. By examining the table the economy of increasing the depth of the silo is observed. A silo 16

Table II.—Amount of Silage Fed Per Day.

KINDS OF STOCK	DAILY RATION POUNDS
Beef Cattle—	
Wintering Calves, 8 months old.....	15 to 25
Wintering Breeding Cows. ....	30 to 50
Fattening Beef Cattle 18-22 months old—	
First stage of fattening.....	20 to 30
Latter stage of fattening.....	12 to 20
Dairy Cattle.....	30 to 50
Sheep—	
Wintering Breeding Sheep .....	3 to 5
Fattening Lambs.....	2 to 3
Fattening Sheep .....	3 to 4



feet in diameter and 30 feet deep will contain 119 tons of silage, while if its depth be 40 feet, it will contain 180 tons, or one-half more.

The Animal Husbandry Section has furnished the following table in regard to the approximate amount of silage required per day for various kinds of stock.

The preceding table in connection with Table I, may be used to determine the size of silo needed to fulfill various conditions. For instance, if the silage is to be fed to a herd of forty dairy cattle at the rate of 40 pounds per head per day, a silo 16 or 18 feet in diameter will be satisfactory.

#### The Design of Silos.

In the Eighth Annual Report of the Wisconsin Agricultural Experiment Station, Professor F. H. King gives the results of investigations to determine the pressure of silage against the silo wall. It was found in these experiments that the pressure of silage upon the silo wall increased with the depth and was equal to 11 pounds per square foot of each foot of depth. Thus at a depth of 20 feet, the bursting pressure in a silo is 220 pounds per square foot, and at a depth of 35 feet the pressure would amount to 385 pounds. A careful investigation of modern practice has proven that an allowance for this pressure is sufficient. As the cost of steel hoops or reinforcement to provide for this pressure is not excessive, further work along this line does not seem to be necessary. In an investigation of several failures of hoops of stave silos, it was found in each case, that their rupture was due to excessive swelling of the staves or to faulty material or workmanship in threading the ends of the hoops.

In stone, brick and concrete silos, there is, however, some doubt as to whether it is necessary to provide enough steel to carry the entire bursting pressure of the silage. Many concrete silos are now standing and in successful service with much less reinforcement than that required by an assumed pressure of eleven pounds per square foot per foot of depth. This is

due to the fact that the wall independent of the steel is able to resist a part of the bursting pressure.

In any cylindrical tank designed to resist bursting, the total pressure tending to rupture a section of the tank varies as the pressure and the diameter. If the diameter is uniform from top to bottom, the stress tending to burst the walls varies as the pressure. Thus in a silo where the pressure increases with the depth the size of the hoops or reinforcement required at the top is small, but must increase with the depth.

Some vertical reinforcement for concrete is generally recommended, although if the horizontal reinforcement is not spaced too far apart, it seems to be of doubtful importance, as no serious stresses are to be overcome in this direction. When used it consists of about one  $\frac{3}{8}$ -inch rod spaced from 18 inches to 3 feet around the wall. The foregoing statement does not apply to the sides of the door openings, which should be carefully and thoroughly reinforced.

#### **Failure of Concrete Silos.**

Often more can be learned of a class of structures from a failure than in any other way. As far as possible, all silo failures were investigated. A silo visited and the details connected with its failure obtained, is used by a canning company to preserve the pea vines which would otherwise be a waste product. It is 60 feet in diameter and 40 feet deep. The walls are 19 inches thick at the bottom and 13 inches at the top. The reinforcement consisted of  $\frac{3}{4}$ -inch round steel rods, spaced 18 inches apart at the bottom and so spaced above that 22 rods were used in the entire wall. There is an excess of juice in pea vines and in order to prevent an accumulation of this and a consequent excessive internal pressure, a large drain was placed at the center of the silo. This drain for the first two years accomplished its purpose, but upon the third filling it became clogged, allowing the juices to accumulate to a depth of at least 20 feet. By calculation it was determined that the bursting pressure in the silo due to 20 feet of juice was more than double the strength of the steel reinforcement in the wall for the bot-

tom 18 inches. This shows conclusively that the concrete was not at fault and this instance cannot be used as an argument against the concrete silo. If the silo is filled with corn that is properly matured, the above conditions cannot occur.

Another concrete silo was found which was giving only partial satisfaction. The wall was very soft and crumbly, due to the poor quality of the sand and gravel used, which contained a considerable amount of clay. The mixture used was one part of cement to seven of gravel, which was not sufficient cement. Another interesting mistake was in the reinforcement, consisting of  $\frac{1}{2}$ -inch cables which had been wound around a drum and took a spiral form when placed in the wall. When the tension came on the cable due to the pressure of the silage, they straightened, pushing slabs off the side of the wall. To avoid such results, the reinforcement should conform as nearly as possible to the circle of the silo.

#### **Anchoring Silos.**

Stave silos or those of light construction, if located so as to be exposed to the force of high winds, should be anchored securely. Silos may be anchored by rods bolted to the lower part of the silo and extending into the foundation. Another more satisfactory way to anchor is by the use of guy wires.

Some manufacturers advise that these extend from the top of the silo to the foundation, but it seems preferable to attach the guy wires to an adjoining building or to posts some distance from the silo. These guy wires should be so protected that stock cannot run into them.

#### **The Foundation.**

The foundation of any permanent building should be constructed of durable material, should be of sufficient size to carry the weight of the building, and should extend below the frost line. The merits of stone and concrete for a foundation are so well and favorably known that no general discussion of these materials is deemed necessary. Cement mortar rather

than lime mortar should be used in laying up all stone foundations. Furthermore, it is not deemed good practice to fill a trench with stone of various sizes and pour mortar over them. It is better to first put in the mortar and then bury as many stones as possible in it.

The practice of digging a trench and filling with concrete is not recommended, unless the soil is firm and of such a nature that it can be finished up smoothly. A tar or building paper lining may be used to line the trenches in porous soils. It is difficult to plaster concrete which has come in contact with the soil. In extending a part of the silo below the surface, the soil should not be used as a part of the inner form. The concrete to be durable and economical should contain only clean and durable stone, gravel and sand. Brick foundations should only be of hard-burned brick laid in cement mortar and when so built are considered satisfactory.

The foundation should have such an effective bearing surface as to prevent any appreciable settling. By effective bearing surface or area of footing is meant the area of that part of the wall and floor which in case of excessive pressure helps to carry the load placed on it. Fortunately, the weight of the silage is supported almost entirely by the floor and not by the foundation. The weight on the foundation is practically only that of the wall and roof. For a concrete silo under 50 feet in height, the width of footing need not be over two to four times as wide as the thickness of the wall for any kind of soil except soft clay or quicksand.

The width of the foundation wall should usually be somewhat greater than that of the side walls on account of the action of the frost. For lighter types of silos a 6 or 8-inch foundation wall with a 12-inch footing will be sufficient except for the two kinds of soil mentioned above. Many foundation walls for silos fail due to uneven settling. When wire or scrap iron of any considerable length may be had at little cost, it may be profitably placed in the footings to prevent the formation of cracks.

### Drainage.

This subject is of great importance and should receive more consideration than is usually given to it in the construction of farm buildings, and especially of masonry silos. Any soil will support a greater load when dry than when wet. This is especially true of clay. The heaving action of frost is due entirely to the moisture contained in the soil, which expands with an almost irresistible force upon freezing. For these considerations, unless the foundation lies in dry, well drained soil, a drain tile should be used to remove the ground water. To assist the water in getting into the drain, the foundation and floor may be placed upon a bed of gravel or cinders. If gravel or cinders are used, they should be well tamped before the foundation is put in place.

Under certain conditions, the silo floor may be dispensed with without interfering with the preservation of the silage. Where the silo rests upon dry clay or any non-porous soil, and where the foundation is deep enough to prevent undermining by rats, the floor may be omitted. In general, however, a floor is quite desirable. The portion of the silo below the ground may be made more nearly water tight, the floor may be thoroughly cleaned, and there is no mixing of earth with the silage. A silo floor need not be thick or expensive, as the weight of the silage, though very great, is distributed evenly over the surface and would be just as firmly supported if the floor was not used. A concrete floor of the usual sidewalk construction, 4 to 6 inches in thickness, will be very satisfactory. If properly mixed sand and gravel can be obtained, one part of cement to five parts of sand and gravel will be about the right proportion to use. The concrete should be thoroughly tamped and troweled.

### The Roof.

Perhaps the greatest advantage of a roof is the lessened liability of the silage freezing. Not only is it impossible to prevent freezing in severe weather unless the silo is provided

with a roof, but during snowy or rainy weather the silage is mixed with snow or wet down with rain. Furthermore, a silo without a roof becomes a catching place for husks, dust or anything carried in the wind and a favorite feeding ground for the neighborhood pigeons and birds. Although many silos are not provided with roofs and the live stock eagerly eat the silage from them, it is evident that a roof would not only reduce the amount of frozen silage, actually save silage and preserve its quality, but be worth its cost in making a more pleasant place to feed from in bad weather. The roof is also valuable in protecting and strengthening the silo and in adding to its appearance. A door for filling, large enough to admit the carrier or elevator from the ensilage cutter, should be placed in the roof. A simple trap door may be used for this purpose, but a dormer window with glass is preferable. Some light should be admitted to the silo, for if not it will be necessary to use a lantern when removing the silage.

The pitch of the silo roof may vary from one-quarter to one-half. The steeper roof permits the silo to be filled above the top of the wall so as to be nearly full after settling. A flat roof does not permit the silage to be elevated to a point high enough to do this, does not give the workmen room for work during filling, and does not shed the snow like a steeper roof. The sheeting is sawed into triangular pieces diagonally across the board and both ends used to prevent waste. The sheeting may be covered with shingles or what is better, prepared roofing. The latter will make a roof more nearly air tight and is very satisfactory when a good quality is used. It also has the advantage that it is very easy to put in place. The roofing should be cut into three cornered strips of a length to extend from the top of the cone to the eaves. In this way the material will be used economically and an air tight roof, retaining the heat, will be obtained. Plain boards do not make a good roof. If they are used the cracks should be carefully covered with battens. Concrete has many of the same advantages for roof construction that it has for other purposes, that is, it can be

made into almost any shape, and is durable. The concrete roof of the Iowa silo constructed at the Iowa Experiment Station, was made by placing a layer of expanded metal known as "Hy-Rib" over the centering placed in the silo and then plastering on top with two coats of cement mortar amounting to about two inches. Then after this had set, the centering was removed from its stumps and the steel plastered on the under side. The cornice was built up with a trowel. The rafters were supported by stumps extending  $1\frac{1}{2}$  inches over the top of the wall and were tied together by collar beams so as to prevent any outward thrust on the wall. Where a single roof is to be constructed, the plastering on the expanded metal may be the cheaper method of construction as a large amount of the forming is dispensed with. Where several roofs are to be constructed and where the forms may be used several times, more perfect forms and less reinforcement may be used economically. It is to be noted in building a concrete roof, a band of steel should be placed at the bottom of the cone to care for the outward thrust of the roof walls.

Following is the itemized cost of the roof described and as erected on the Iowa Silo at Ames. In building the second roof, no doubt the labor cost could be reduced very much:

**Cost of the Concrete Roof on the Iowa Silo at Ames, Iowa.**

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Steel reinforcement—special expanded metal .....	\$18.00
Centering—native lumber .....	5.00
Labor in erecting centering—20 hrs. at 20c .....	4.00
Labor in putting steel in place—75 hrs. at 20c .....	3.00
Cement—10 bbls. at \$1.50 .....	15.00
Sand and gravel—5 yds. at 50c .....	2.50
Sash, hinges, etc .....	2.50
Labor in putting concrete in place—63 hrs. at 25c .....	12.60
Superintendent—3 days at \$3.50 .....	10.50
<b>Total .....</b>	<b>\$64.10</b>

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A patented opening silo roof is sold with the Philadelphia stave silo. It is so constructed that the eight sections can be opened up to an almost vertical position above the silo wall. These sections are connected with pieces of canvas which when the roof is closed hang inside of the silo. The advantage of this construction lies in the fact that the silo can be filled more than full, furnishing an almost full silo after settling.

As already stated, the silo door should form an air tight joint with its frame and be flush or smooth on the inside. In addition, it should be convenient for the removal of silage and of a size to permit any person to enter the silo. Most patent silos are now provided with continuous doors which are only obstructed by the hoops or bars extending from side to side. Often these connections or hoops are so close together that the so-called continuous door is of little advantage over doors of larger size placed in the silo wall at intervals above one another.

In stave silos the doors are usually made of the same material as the silo itself. Short sections of the staves are usually fastened to cleats of the same curvature as the silo. The doors rabbeted at top and bottom and rabbeted or beveled at the sides to fit together and into the door frame. Various patented devices are used to hold the doors in place. Concrete silos are now in use which have the doors located spirally above the silo. The idea of such an arrangement is to avoid a vertical line of weakness. This is an unnecessary precaution, as many silos with the doors directly above one another have been in use for years and no cracks have developed. By using the same amount of steel between the doors as is used in any other vertical section of the wall, there is no more danger of failure between the doors than at any other place in the silo. The location of doors in this manner does not permit of the usual chute through which the silage may be dropped and which is almost essential.



### **Ventilation.**

Carbon dioxide, a gas heavier than air, will collect above fresh silage if not given an opportunity to flow away to a lower point. This might be the case where the doors are not continuous and the gas is pocketed below a door. Care should be used in beginning work in a silo after it has been standing for a time partly filled with fresh silage. If silage is allowed to fall into the silo for a time, the carbon dioxide will be stirred up to such an extent that there will be no danger from asphyxiation. Although many silos are provided with ventilators, it is doubtful if they are of any practical value whatever. Under usual conditions, after the silo is filled it is best to prevent circulation of air above the silage.

### **Filling the Silo.**

Best results are obtained where the silage is uniformly distributed throughout the silo and is carefully packed near the walls and around the doors by tramping. If the corn is at all dry, it will be found very beneficial to tramp thoroughly the entire surface and in any case the top 8 feet of silage will be materially improved by thoroughly tramping over the entire surface. In each of these cases, the weight is not sufficient to force the air out without the aid of tramping. Care should be taken that the heavy and light portions shall be uniformly mixed. Some silo owners are of the opinion that a great amount of tramping is unnecessary, but the investigations of the writers indicate that where tamping is not followed there is always a certain amount of spoiled silage and that the money spent for labor used in thoroughly tramping silage bring good returns. When the silage is dry, water should be added at the top in at least sufficient quantity to cause the silage to settle well and to exclude the air.

### **The Freezing of Silage.**

It is desirable to prevent the freezing of silage in the silo during cold weather as far as possible. The silo of a construction to prevent freezing to the largest degree is the preferable

one, other things being equal. It is difficult to make a comparison between the merits of the various types of silos in this respect owing to the inability to find them under like conditions. Freezing of silage is due to loss of heat; first, through the silo wall; and second, to the air in contact with the feeding surface. The first loss may be reduced by using a non-conducting wall in the silo and the second by preventing the circulation of air above the silage in the silo.

It may be impartially said that, as far as the prevention of freezing of silage is concerned, the stave, stone, single wall brick and concrete silos are of about equal merit. Any kind of an air space will partially prevent freezing, depending upon how little the air circulates in this space and also upon how much conducting material is required to tie the outer and inner walls together. The King and Gurler silos were among the first to make use of an air space to prevent the loss of heat through the walls, but the air spaces were so deep that circulation of air from the top to the bottom of the wall was quite free and readily transmitted heat from wall to wall in this manner.

Cement blocks have more or less material extending from wall to wall which acts as a direct conductor. In double wall brick silos it is necessary to have a header course occasionally to bind the two walls together. The clay pipe silo has considerable material extending from wall to wall. The construction of the walls of the Iowa silo are such as to thoroughly restrict the circulation of air, but like those previously mentioned has considerable material connecting the two walls. The ratio of this material to the air space is about one to four, but tile is a rather poor conductor of heat. When properly made the double wall concrete silo is perhaps the most nearly frost proof of all. The conducting material between the walls consists only of small metal ties and the circulation of air may be cut off by the insertion of horizontal tar paper partitions.

The second cause of freezing mentioned, that is, the loss of heat from the silage surface, is too often the cause of unneces-



VIEW IN A GERMAN TOWN, WHERE 1,000 COWS  
ARE KEPT IN STABLE ALONG THE STREET.

Photographed by Prof. E. H. Farrington.

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sary freezing. If the air above the silage is confined, no serious loss of heat can possibly take place. When the top of the silo is open and free circulation of air permitted, it is almost impossible to prevent the surface from freezing in severe weather. A personal investigation of silos in cold weather proved conclusively that those provided with a tight roof did not contain nearly as much frozen silage as those left open.

The freezing of silage does not necessarily mean a loss, as it may be thawed out and made fit for feeding and when properly attended to need not rot or mold. The frozen silage may be often thawed by mixing with the warm silage at the center of the silo. It is generally considered dangerous to feed frozen silage.

#### **Types of Silos.**

Square silos are practically a thing of the past. They were developed before the round silo, but generally gave trouble by the bulging of the straight sides and the spoiling of the silage in the corners. In addition to this the material of construction is not so economically used or distributed to resist the pressure of the silage as in the round silo. The first two difficulties were somewhat reduced by filling the corners of the square silo, making it octagonal. However, this was only a transitional stage in the development of the round silo and very few are in use. To those who may be especially anxious to build a square silo in the bay of a barn or a similar place, it is just to state that a few very satisfactory square silos are in use. The success of the square silos investigated depended upon the fact that they were quite small, usually ten by ten feet, that the walls were made very stiff and when filled great care was used in tramping the silage well into the corners. However, the building of a square silo can seldom, if ever, be profitable or desirable.

#### **The King Silo.**

The Wisconsin silo or the King silo, as it is generally known, was designed by Professor F. H. King of Wisconsin,

at a time when lumber of a good quality could be secured at a much less cost than at present. In brief its construction is as follows: Studding of 2x4 stuff is placed one foot apart on a circular sill on top of the foundation. The lining of the silo consists of three layers of  $\frac{3}{8}$ -inch boards bent and nailed to the studding with building paper between. The studding is covered on the outside with one layer of  $\frac{3}{8}$ -inch sheeting and then with any form of siding which may be bent and nailed to the studding. If the silo is of small diameter, the sheeting may be omitted. In keeping silage the King silo is very satisfactory and when the wall is ventilated in order to prevent rot on the inside, it should be as durable as any wood silo.

#### **The Gurler Silo.**

The Gurler silo was designed by Mr. H. B. Gurler, and the first silo of the kind erected fourteen years ago was visited and found in good condition. The Gurler silo resembles the King silo very much, but differs mainly in that the lining is made up of a  $\frac{1}{2}$ -inch layer of sheeting and cement plaster about  $\frac{5}{8}$ -inch thick on special lath. It is primarily a silo to be located inside of the barn and when so situated the only covering to the studding consists of wooden hoops made of three-ply of  $\frac{1}{2}$  by 6-inch boards. When used outside vertical siding may be nailed to the hoops, which when well battened makes a very satisfactory covering. The hoops may be dispensed with and the studding covered with galvanized sheet iron. This plan is very satisfactory, but perhaps a little more expensive under usual conditions. Horizontal siding bent and nailed to the studding is not generally satisfactory, as the nails will pull out, releasing the ends of the boards, which often in time come off entirely. As stated, the Gurler silo is not primarily a silo for a location outside of protecting buildings, as the action of the wind is quite apt to rack it and cause the cement plaster to crack. This can be prevented to a large extent by placing the hoops on spirally, thus stiffening the silo very much. Under usual conditions its cost is somewhat greater

than that of a stave silo, but it is believed to be more durable. Like the King silo, provision must be made for ventilation by allowing air to enter the bottom of the wall from the outside, passing up through the wall into the silo at the top of the wall and out through a ventilator in the roof, in order to prevent rotting of studding and board lining. Neither the King nor the Gurler silos can well be built of less diameter than 14 feet owing to the difficulty in bending the material.

#### **The Minneapolis Silo.**

This silo is constructed differently from other patent wooden silos and for this reason needs a separate description from the stave silos. Short pieces of 6-inch plank tongued and grooved on the side and beveled on the ends, are inserted horizontally between 4x4 studding placed two feet apart, and in such manner as to form a smooth wall on the inside. The whole is held tightly together by hoops or bands.

Some of the advantages claimed by the manufacturers are as follows: Lumber shrinks very little endwise of the grain, therefore, the work of the necessary tightening and loosening of the hoops on these silos is considerably less than is necessary with the average stave silo. Defective portions of the material can be rejected with less loss than from long lumber. If a section of the wall proves defective after it has been used for a time, it may be cut out, the sections above driven down and a new piece inserted at the top. The roof as usually constructed would interfere with this change of planks. It is also to be noticed that a large number of the joints permit the juices to reach the end grain of the lumber and perhaps hasten their decay. The cost of this silo made of white pine is about equal to that of the best stave silos.

A steel silo which was visited a year ago had only been filled once and did not furnish sufficient basis for an opinion. There seemed to be little doubt but what it would preserve the silage satisfactory other than more trouble was incurred from freezing than usual. This silo was small, being only 10 by 20, and it

was made perfectly smooth on the inside. Another type has the walls made of corrugated plate. Farther investigation of the steel silo would indicate that they are in the experimental stage and are not likely to come into extensive competition with other types.

### **The Stave Silo.**

Out of the 124 silos reported in Iowa when the first edition of this bulletin was prepared, 82 were of the stave type. There is no doubt whatever but that the stave silo is a thoroughly established success. The measure of success depends largely, however, upon the method of construction, material used, and care that is taken of the silo. If properly constructed, the stave silo incorporates nearly all of the essentials of silo construction previously discussed. If staves are of high grade material, well tongued and grooved and the hoops kept tight, the walls are necessarily tight and the doors are fully as tight as in any other type of silo. In addition, the walls are smooth and rigid. The doors are as convenient as in any other silo and, of course, any discussion of foundation, floor and roof applies equally well to the stave silo as to any other.

The lasting qualities of stave silos have been discussed to a great extent without any definite conclusions being reached. It is stated by some that the life of a stave silo is but five years, while others claim they will last indefinitely. The reasons for this seems to be that the stave silo is subjected to such widely different treatment, like farm machinery. Investigation would indicate that the life of a stave silo varies from less than five years to, in some instances, more than twenty-five years, depending upon the quality of the material used in the silo and the care given to it. A redwood silo filled eleven times was found in excellent condition without a single flaw or decayed spot. A white pine home-made silo erected in 1894 was visited and found to be giving good service. It was apparently good for a number of years yet. Another white pine silo was found very seriously decayed inside, while it was



in a fair state of preservation outside. A northern pine silo four years old, was found in poor condition with the lower ends of the staves badly rotted even though placed on a good high foundation.

In caring for a silo, care should be taken to keep it well painted outside. Most manufacturers advise that white lead be placed in the joints when the silo is erected and that the inside of the staves be painted with some form of wood preservative.

All stave silos outside of barns, even when secured by guy wires, are more or less at the mercy of the wind and weather. If there are any imperfections in the lumber they are quite likely to develop, and if there is any tendency on the part of the staves to warp they will be sprung out of shape. This is perfectly true of silos with tongued and grooved staves and deplorably true of silos with plain staves.

#### **Selecting Lumber for the Stave Silo.**

In the purchase of a stave silo, the selection of the kind and grade of lumber is of the greatest importance. It is stated in the catalogue of one of the leading manufacturers selling silos in Iowa that "the quality of the lumber used really determines the success or failure of the silo." Badly cross-grained lumber or any containing heart or wind shake, sap, or bark should be discarded. In order to have an opportunity to sort the lumber the silo should be ordered early and an early delivery guaranteed so that all poor staves may be discarded and new ones secured to replace them even if it is entirely at the purchaser's expense. A poor stave should never be put in a silo, as it lowers the value of the entire structure. This is true of all kinds of lumber and the judging of its quality must rest with the purchaser. There are, however, some qualities and characteristics which are of importance in silo construction that are possessed to a different degree by different woods used in silo construction. Following is a discussion of the different woods commonly used in silo construction named in order of

their relative merits according to the opinion of the writers. Their cost is so variable for different localities that it is not considered here.

#### Kinds of Wood Used in Silo Construction.

(a) Redwood is one of the conifers which is generally accepted as having the best lasting qualities of any wood used in silo construction. Redwood trees are very large and the lumber uniform. In buying redwood silos, a very good grade of practically clear and full length staves may be secured. The shrinkage and swelling due to moisture is less than in other woods. This is quite an advantage on account of the shrinkage that occurs when the silo is empty. A stave silo built of this material eleven years ago was recently examined carefully. Every stave was gone over with a knife and not a soft spot was found anywhere. This examination was especially critical near the foundation. Redwood is the wood principally used for conduits.

(b) Cypress being similar in quality and characteristics to white cedar is well adapted to the construction of silos. Only clear or good sound knotted stock should be used. More cypress than any other kind of wood is used for water tanks in the middle west.

(c) Oregon fir is an excellent wood for stave silos, as it can be secured in full length staves and is quite clear and uniform. With reasonable care and a foundation high enough to raise it above moisture, a silo with fir staves should last for a long term of years.

(d) Tamarack or larch is very similar to the best hard pine, but where equal grades of each are obtainable it is slightly preferable on account of its greater durability.

(e) White pine, if free from loose or large knots, makes a very good silo. The staves cannot usually be obtained in full length staves for a desirable height of silo.

(f) Long leaf yellow or hard pine is the strongest and stiffest of all pines and if a choice grade is secured, it makes a

very good silo at a reasonable price. It shrinks a little more than the woods previously mentioned, but the hoops of any stave silo should be tightened when the silo is empty.

#### **The Homemade Stave Silo.**

Directions have been given in bulletins and in the agricultural press for making silos from plain dimension stuff which is neither beveled or tongued and grooved. Many of these silos have been built, but the investigation of the writers was convincing that construction of this nature is not advisable from any standpoint. Although the first cost is much less than the mill-made silo, in the end it is not as economical. If well constructed of good lumber, the plain stave silo does quite well the first year, but the staves not being beveled or grooved slip past each other to the inside, and have a good opportunity to follow any warping tendencies which may develop within the stave. When the hoops are not tight, there is little or nothing but the plate at the top and the foundation below to hold the long staves in place.

#### **The Buff Jersey Silo.**

The Buff Jersey silo was designed by E. W. Cobb and in several respects is superior to the home-made silo just described. It is advised that this silo be made of plain 2 by 4 material 14 and 16 feet long, thus making by splicing a silo 30 feet deep. This lumber should be dressed on both edges and carefully selected as previously described. Also any pieces which are not of uniform width throughout their length should be discarded. Such pieces are unfit for use in the silo, unless the smaller end be placed at the top of the silo, where if not making a perfectly tight fit it will be of little consequence. The stave splices are made by making a saw cut with a common hand saw and inserting a piece of galvanized iron. Each 2 by 4 is thoroughly coated with coal tar before erecting. The staves are spiked together every four feet with spikes long enough to reach through the stave edgewise and at least one inch into

the adjoining stave. Each stave in the wall should be securely toe-nailed to a sill formed of two layers of inch lumber sawed to conform to the circle and nailed together breaking joints. The hoops are in sections extending through 4 by 6 pieces, three to five of which are placed in the wall, flush with the inside. The hoops are spaced 30 inches apart. The wall is built solid, and the doors are sawed out beveled at the top and at the bottom so that the bevel will retain the door when pressed outward by the silage. This bevel is about 45 degrees. Curved cleats can be fitted and nailed to the pieces sawed out to form the door. Another way is to nail the cleats in place before the door is sawed out and then by ripping a stave on each side of the door a bevel may be secured all the way around which will fit without any dressing.

This is a cheap, serviceable silo, but in many respects it seems advisable to pay a company equipped for building first-class silos a reasonable price for a silo ready to erect, with staves beveled, tongued and grooved, and fitted with convenient doors.

#### **The Patent Stave Silo.**

A large number of patent stave silos were either reported or visited and all were, in general, quite satisfactory. They all have the same fundamental features. They are all of various heights and diameters, use very much the same amount of steel for hoops, the staves are tongued and grooved, and either full length or well spliced. Full length staves properly beveled are, of course, preferable. There are at least two methods of splicing short staves. The steel splice should project a trifle beyond the edges of the stave to be spliced in order that it will be pressed into each neighboring stave making a tight joint. The steel lasts well and is very satisfactory. The second method is used only by the Indiana Silo Company. This is also a very satisfactory method. In this connection it is well to remember that any racking or twisting of the silo will open up either of these joints permitting access of air and consequently the loss of silage. The silo is sold with or without a roof, with

a roof frame, or with a completed roof. Of course, each silo has its talking points, but the strength of these talks depend more upon the salesmen than upon the features of the silo. The most important thing to the prospective purchaser is to so arrange the terms of the sale that good workmanship, select material of the right kind, and fair treatment, may be secured.

After the silo is selected a good foundation should always be built, and care be taken to paint all joints with either white lead and linseed oil or a creosote paint. An excess of tar or heavy white lead paint should be put on the ends of the staves to be joined in order to secure an air tight joint, because only a very small amount of air is necessary to spoil the silage and a large percentage of the joints unless put together with white lead or tar will leak enough air to spoil considerable silage. The presence of this air together with warmth and moisture present excellent conditions for the decay of the stave at its most vulnerable point, the end grain of the wood. The life of the silo will depend largely upon care taken in keeping the hoops at proper tension, keeping the silo well painted and preventing the collection of refuse about the bottom of the staves, which will keep them moist and thus promote decay. In keeping the hoops tight the owner should frequently, at least after emptying and during and continued dry or wet weather, tighten the hoops if they are not tight. If they are tight they should be loosened and then tightened again to be sure they are not too tight, for if too tight the wood fibre will be crushed, causing rapid decay.

#### Concrete Silos.

A few years ago it could have been said that concrete silos were in the experimental stage, but now it has been demonstrated by the success of many of them, that concrete is one of the best building materials from which to construct permanent silos. Considering that the general use of concrete has been developed within a very few years and the majority

of concrete silos have been built by men with little or no experience, the success of the concrete silo has been remarkable.

In order to secure a first-class concrete silo, it is necessary that good materials, well mixed in the right proportions, be used in preparing the concrete, and that the whole be skillfully handled. If these requirements are fulfilled, the writers upon investigation are confident that the concrete silo is satisfactory in every way. The investigations, however, would indicate that it is not advisable for the man with no experience in concrete construction to attempt the building of a concrete silo. The expense involved is too great to warrant the individual farmer who has not previously constructed buildings of concrete in making the experiment. The work should be turned over to the concrete contractor under a guarantee that only a first-class silo be built. In time, when the use of concrete on the farm becomes more general, this suggestion will not have the value that it has now.

As the concrete silo must be constructed where it is to be used and as it comes into competition with a well established industry, it is to be expected that it should meet with much opposition and advantage taken of all the features which would in any way prevent it from being a first-class silo. The arguments raised against it are that the concrete walls permit a transfer of moisture and air through them and do not prevent a loss of heat, that the concrete neutralizes the acidity of the silage, that this acidity causes the walls to become soft and crumbly, and that cracks due to the pressure of the silage cannot be prevented. In answer to these arguments, it may be stated that the walls should be nearly water and air tight. They can be made so if properly built and painted on the inside with a wash of pure cement, which will fill all the pores of the wall. It is very doubtful if more frozen silage will be found in a single wall concrete silo than in a stave silo. Wood, as a material, is no doubt a better non-conductor of heat than concrete, but the thickness of the wall is very much less. There is nothing better than the double wall cement silo in this re-

spect. In regard to the concrete neutralizing the acidity of the silage, it may be stated that for such a thing to take place there must be enough moisture present to permit the dissolved cement to diffuse itself throughout the acid solution. The amount of moisture present renders this action quite impossible. Concrete silos were found in actual use which had been filled eleven times without any noticeable action of the acidity of the silage in softening the walls. These silos were not coated with a cement wash, but it is considered good practice to paint the walls on the inside with cement every two or three years. A coat of coal tar has been used successfully by some silo owners for the same purpose. This painting may be done while filling if the walls have been swept down well as the silage is fed out.

Among the desirable features of the concrete silo or any masonry silo may be mentioned that it is essentially fire-proof. A silo was found in use in Wisconsin which had withstood a fire that burned all the surrounding buildings.

#### **Single and Double Wall Concrete Silos.**

The single wall concrete silo is the most common style of construction. The thickness of the walls of silos now in use varies from 6 inches at the bottom to four inches at the top for the lightest wall to a wall two feet in thickness, which is the heaviest of which the Section has record. Six inches seems to be the most desirable thickness for common sizes of silos under existing practice. The walls might be made lighter at the top, but the saving of material would hardly balance the trouble of varying the size of the forms. The double wall concrete silo at present is made only with a patented form. The inner wall is  $5\frac{1}{2}$  inches thick, the outer wall  $3\frac{1}{2}$  inches thick, and the two tied together with steel ties with a three-inch air space between. Circulation is prevented by inserting horizontal tar paper partitions every  $3\frac{1}{2}$  feet. This construction, besides being as satisfactory as the single wall method, places it entirely above any criticism in regard to freez-

ing. The patent forms being of steel plate enable a very smooth job to be secured.

#### **Making and Handling the Concrete.**

Only a first-class Portland cement which has been stored in a perfectly dry place should be used. The proportions of cement and gravel will vary with different grades of gravel. If broken stone is available and cheap, it may be used with sand instead of gravel. To obtain the best grade of concrete the gravel and sand must be clean and durable and the cement must be in such a proportion as to nearly if not altogether fill the voids or open spaces between the sand and gravel. To obtain the strongest concrete with the minimum of cement the sizes of the gravel should be in the right proportion and vary from the largest to the smallest sand particles.

If bank gravel is used, the proper proportion of cement to use may be determined by the following method described in "The Cement Workers Hand Book," by W. H. Baker: "Fill a vessel of known capacity level full with the stone or gravel and sand and thoroughly mix in the proportions wished for use. This will usually be as the gravel comes from the bank. This must be thoroughly soaked so as to absorb no more water, but should not contain an excess. Now measure and pour in as much water as the vessel will contain. The proportion of the volume of water poured in to the volume of the pail is the proper proportion of cement to gravel. This is quite a simple method of determining the space that the cement should fill to make a good dense concrete. Under average conditions one part of cement to five of gravel is a good mixture for silos. Stones as large as two inches in diameter may be used to advantage."

Another essential of good concrete is thorough mixing. The whole must be so thoroughly mixed that there will be a coating of cement over each particle of inert material. Enough water should be added so that when the concrete is placed in the forms the whole will quiver or tremble as it is tamped. Thor-



ough tamping is necessary, as it brings all the particles into intimate contact. In adding to the work of the previous day, it should be first thoroughly wet, cement sprinkled on the hardened concrete, and then two inches of freshly mixed concrete put in place and thoroughly stirred to bring the finer material into close contact with the hardened concrete. This care is taken to prevent a poor union between the old and new work and the subsequent air leakage or crack which might form. The coarse material should be worked away from the sides of the forms by a common spade, or what is better, a special concrete spade with holes in it to permit the finer material to pass through, while the larger pieces are pushed back. For several days the concrete while hardening, must be kept moist by sprinkling.

#### **Reinforcement.**

The height of the forms are 30 inches, which is just equal to the height of the windows inside and the distance between the windows. By placing the circular reinforcement two inches above and below the doors it will come near the middle of the forms each time that it is inserted. Reinforcement placed in the center of the wall in this manner will be very satisfactory. Bars, rods, or wire may be used for reinforcement, provided the same cross section of steel is obtained. At each side of the doors a medium sized bar of vertical reinforcement should be used, placed somewhat nearer the outside of the wall than the inside.

#### **Common Mistakes in Concrete Silo Construction.**

In the construction of many silos an attempt has been made to use sheet iron for the inner form, which springs out of shape when the pressure of the concrete comes against it, making an ill-shaped silo. The inner form should be so constructed as to be rigid enough to retain its shape under the pressure of the fresh concrete. Another serious mistake eliminated in the new design is the door without a wooden frame. A wooden frame not only rots away in time, but often causes serious air leaks into the silo.

### Cost of Concrete Silos.

The cost of a concrete silo will depend largely upon the cost of gravel and labor, which varies greatly. The cost of gravel in Iowa will range from nearly nothing where it is dug out of the silo pit to a prohibitive price, owing to its inaccessibility. The estimate of an average cost is assumed at \$1.25 per yard. The cost of labor varies much. On one silo of which a record of the labor was kept, four men put 11 yards of concrete in an 8 inch wall in one day. In another well organized gang four men put only 4 yards in a 6-inch wall. With labor at \$1.75 per day and a foreman \$3.50, the labor in handling a yard of concrete ought not to cost much over \$1.75.

### Cement Block Silos.

This type of silo is very satisfactory if the blocks are well made and plenty of steel has been provided in the wall for resisting the bursting pressure of the silage. Where silos of this construction have failed, this has not been the case. A convenient block with a groove in the top in which the bands of reinforcement are imbedded. The reinforcement should be entirely surrounded by mortar in order to fully protect it from rust.

The practice of using wooden studs embedded in mortar at the ends of the blocks and at each side of the doorway and bolted to the steel frame cannot be criticised too severely. This stud is placed under conditions best adapted to cause rapid decay. Often it is so constructed that it cannot be replaced without much difficulty and thus the durability of the entire structure is impaired by the use of a single part.

It is necessary to plaster the inside of the silo to make it water and air tight. The block silo has the advantage over solid wall concrete silos in that forms, outside of the block mold, are dispensed with. The block is made hollow, thus providing against freezing. The cost of the concrete block wall is usually somewhat higher than the solid wall owing to the fact that as large aggregate or gravel cannot be used and the cost of making the blocks is about equal to the cost of making the solid wall with the cost of laying the blocks in addition.

### Brick Silos.

Where brick may be secured at a reasonable price, it may be used for silo construction with good results. Several brick silos were investigated and as a whole they were very satisfactory. The chief trouble with their erection seemed to be with the reinforcement. Attempts to build silos without any reinforcement resulted in failures as far as investigated. The solid wall brick silo is not much if any better than the stave silo as far as protection from freezing is concerned. The wall is usually eight inches thick and reinforced by hoops or bands on the outside or in the mortar joint. The oldest brick silos found in Iowa were erected in 1903 and are now giving very satisfactory service. The doors were arched, dispensing with the use of wooden frames.

### The Christensen Silo.

This silo was invented by Mr. J. P. Christensen. The patent pertains to the system of reinforcing and its combination with a continuous door opening. It is a single or four inch wall silo, partially protected by its location in a valley and by the surrounding buildings and gives little trouble with the freezing of silage. In order to prevent freezing more fully, the complete design of this silo calls for a double wall. There is a restricted circulation of air which prevents a serious loss of heat. Horizontal air spaces are separated by the header courses about two feet apart with a small opening in alternate courses each side of the doors and others in intervening courses at the opposite side of the silo from the door. For exceptionally cold climates, a fire place is provided from which the smoke and heat pass up through the ventilating flues. This silo gives excellent satisfaction. The cost will, of course, depend upon the price of brick and wages paid for masons.

Mr. Christensen gives the following estimate of the cost of silos without roof based upon brick costing \$8 per thousand, masons \$4 per day, and helpers at \$2 per day.

Single Wall Silos:

14 feet in diameter	\$ 9.00 per foot of height
16 feet in diameter	10.00 per foot of height
18 feet in diameter	11.50 per foot of height

#### Double Wall Silos:

14 feet in diameter	\$13.00 per foot of height
16 feet in diameter	14.00 per foot of height
18 feet in diameter	16.00 per foot of height

Many excellent stone silos were found in Wisconsin giving the best of satisfaction. They are especially attractive in appearance and there is no doubt about their reliability when plastered so as to make the walls air and water tight. They are about as frost proof as single wall brick and concrete silos. The walls, however, are thicker, ranging from 16 to 24 inches, depending largely upon the kind of stone. It is best that only cement mortar be used. The walls should be reinforced by building steel bands into the wall. The cost of the stone silo will depend altogether upon the availability of the stone.

#### Clay Pipe Silos.

The clay pipe silo is constructed of interlocking clay pipes or tiles. Several of these silos were visited and found to be giving good satisfaction. The clay tube is similar to a five inch drain tile except that the walls are heavier and slotted at four points 90 degrees apart to a depth of one-fourth its length. The tubes are set on end with the slots interlocking. Steel bands or hoops are placed around the wall and then plastered smooth with cement plaster. This type of silo up to the present time has been rather expensive.

#### The Iowa Silo.

The Iowa silo is a new type of silo with walls constructed of common rectangular building tile. As far as known to the writers at the time the first edition of this bulletin was prepared, silos had not up to that time been constructed of this material. A thorough investigation of the matter left but little doubt in regard to the reliability, adaptability, and cheapness of



A HOLLAND MILKMAID.

Photographed by Prof. E. H. Farrington.

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building tile for silo walls. For several years, tile has been used with the best of success for the construction of fireproof grain storage tanks. The advantages of building tile for silo construction are many. The nature of the work is thoroughly familiar to bricklayers and masons in every locality and a satisfactory job is practically assured. Every feature of the design, by its application to a similar use, has proven its practicability. Owing to the fact that tile itself is splendid non-conductor of heat and that the circulation of air in the hollow wall is so well restricted, perhaps no silo can provide better protection against freezing. In addition, the construction is as fire proof as any masonry construction.

The material used in the Iowa silo as originally designed was rectangular, hollow, clay building blocks, such as have been commonly used extensively in important buildings for years. Furthermore, it was designed with a plaster coat of cement mortar both inside and outside. The experimental silo was not plastered, simply washed inside with a cement wash and for the year it has been in use it has been entirely satisfactory, indicating that plastering is not necessary where a tile block is used which will resist the weather. It is to be noted that the durability of this type of silo will depend upon the quality of the tile, which varies widely. Soft tile which have not been properly burned should be guarded against. On the other hand, good vitrified blocks are among the most reliable and durable of all building materials. Special blocks bent to the curvative of the silo may be purchased from several manufacturers in the state. Ten or more silos have been built of these curved blocks during the past summer and a full account of the success of these silos will be published later.

The previous discussion of foundations applies in general to this class of silos, but circumstances may arise where it may be desirable to use tile beneath the ground. It has not been fully demonstrated that any clay product but a hard burned vitrified tile or brick will withstand such use. The tile in the foundation are stood on end and filled with concrete. Outside of the

tile, four inches of concrete is filled in. If the soil is firm, no form will be needed below ground and above ground a circle of tile may be laid up temporarily to make a form for the protecting concrete. In this way the use of expensive forms may be dispensed with entirely. If it is found that the tile are fully protected in this way, it will be best to lay them horizontally, making the foundation as frost proof as any part of the structure.

The tile blocks, for walls, which may be of any of the common dimensions in use, are laid in a rich cement mortar. The blocks are used 5 by 8 by 16 inches, but blocks 4 by 8 by 12 and 4 by 5 by 12 inches have been used successfully. To make a smooth wall the blocks must be bent to the curvature of the silo. Several manufacturers are now prepared to furnish the bent blocks without great additional cost.

The door frames are of concrete. The concrete is placed at the ends of the tile of the wall, and though not shown, the concrete extends back into the tile from 4 to 8 inches, bonding the frame securely to the tile of the wall. The distance this runs back into the wall depends upon the amount of tamping and the amount of water in the concrete.

Any one of several methods of reinforcement may be used in the Iowa silo. The wire, which when purchased, is received in coils, is drawn through a section of one inch pipe bent sufficiently to straighten the wire until it takes the curvature of the silo wall. If extending entirely around the silo, the ends are lapped and bent so as to form a loop at the ends, or if the reinforcement extends into the side of the door frame, the loop is made to encircle the vertical reinforcement which should be placed there. A one-half inch rod was used in the experimental silo at each side of the doorway about two inches from the surface. In using steel for reinforcing, it should all be thoroughly protected from rust by imbedding it within the concrete.

The Christensen system of reinforcement might be used to good advantage or, in other words, tile blocks could be used instead of brick in the Christensen silo.



**Continuous Door.**

The advantage of a continuous door making it possible to climb a ladder on the inside of the chute and step directly on to the silage without even stooping would be appreciated by all and especially by the man past middle age. The doors could be of any height, perhaps simply tongued and grooved plank sawed as long as width of door. The chute is built with the rest of the silo, of the same masonry construction, and the reinforcing steel passes around the chute. However, for concrete brick or tile, a light steel rod may be laid in the wall which makes a reinforced beam of that portion of the wall that if properly built will withstand the silage pressure.

If this chute were roofed over, the doors could all be left out and no warm air escape. Windows should be provided at frequent heights along the chute thus providing plenty of light within the silo. The silage chute is quite essential and should be as permanent as the rest of the silo. This being the case the extra expense of a door of this type is entirely justified.

**Estimated Cost of Iowa Silo.**

Size 16 feet in diameter by 35 feet high.

Excavation— $3\frac{1}{2}$  feet deep ..... \$ 6.00

Amount of concrete required—

Foundation ..... 5 Yds.

Floor ..... 3 Yds.

Door Frames ..... 1 Yd.

Total ....  $\frac{1}{2}$  ..... 9 Yds.

Labor at \$1.75 per yd.....\$15.75

Gravel at \$1.25 per yd..... 11.25

Cement—7 bbls. at \$1.50..... 10.50

Total cost of concrete..... 37.50

## Walls:

Tile, 2,000 5x8x16 at \$65.00 Per M.....	130.00
Labor of laying—Mason 6 days at \$4.00.....	24.00
Labor of laying—two Helpers—6 days at \$2.50 each .....	30.00

## Mortar for laying—

Sand 2½ Yds.....	3.12
Cement 8 bbls. at \$1.50.....	12.00
Lime 1 bbl.....	1.25
Total for mortar.....	16.37

Steel .....	15.00
Forms for Door Frames.....	12.00
Doors at \$1.00.....	6.00
Steel ladder at 12 per step.....	3.00
Concrete roof .....	65.00

Total cost .....\$344.87

A frame roof may be constructed for about \$40.

### The Success Silo.

Since designing the Iowa silo, it has been learned that tile blocks have been used for silo construction in Ohio for at least six years. Success silo is constructed from patented blocks. These blocks are heavier than the common building block and they are laid on end. The walls are made strong enough to resist the pressure of the silage by the use of a U shaped key of the same material as the block which slips over the end walls and is just large enough to lie between the two partition walls of the block above, thus doubling the strength of a single bond.

The Section obtained the names of the owners of 26 of these silos and sent a letter of inquiry to each, obtaining 20 replies. In every case the owners were pleased with their silos. Some of these silos have been in use six years and were reported in as good condition as when first erected.

## BUILDING GOOD HERD.

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ADDRESS AT STATE FARMERS' INSTITUTE.

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By

Mr. Chas. Foss, Treasurer Illinois Dairymen's Association.

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Professor Fraser has told us that about one-fourth of the cows in Illinois are kept at a loss, and that the best one-fourth return a profit of \$30 per cow per annum.

There is, certainly, a vast difference between keeping a cow at a loss and keeping one at a profit of \$30. But why do we keep a cow that does not produce a profit at all? Simply because we cannot always distinguish the poor cow from the good one. Too many dairy men are content if their herds return a small profit while, if they would sell the low producers, the profits of the herd could be materially increased.

We have too many poor cows in our herds who are consuming the profits of the good cows and thereby reducing the profits of the entire herd. It is possible that all the cows in Illinois be made to yield a profit of \$30 per cow instead of only one-fourth of them. This may seem high to be reached by all the dairymen of Illinois, but it can be done if the dairymen only wake up to the situation.

In order to accomplish this, we must weed out the poor cows. Feed the good cows a balanced ration, and breed for better cows by heading our herds with the best sires obtainable.

How can we detect the poor cows in our herds?

Is it possible to distinguish a good cow from a poor one by outward appearance? Not always. There is but one absolutely reliable way and that is by using the scales and the Bab-

cock test. A pair of scales, some half pint bottles, some corrosive sublimate tablets for preserving the samples, and some milk sheets do not cost much, and if properly used will return many times their cost in a year. You will then be able to distinguish the poor cows from the good ones. I have been testing my herd and keeping an individual record of each cow for over five years.

Before I tested my herd I averaged about \$30 per cow per year for butter fat at the creamery. I was quite sure I was not receiving as much from my herd as they cost me to keep them, or, at least, was not making any profit.

In December, 1903, I began testing my herd and have been testing them continuously ever since.

The first year I tested, my herd of fourteen cows averaged 5,800 pounds milk and 224 pounds fat. The lowest cow produced 3,321 pounds of milk and 151 pounds fat, while the best cow produced 9,802 pounds of milk and 386 pounds of fat, a difference of 6,481 pounds of milk and 235 pounds of fat. Six of the fourteen cows I had produced less than 200 pounds of fat.

The lowest seven cows averaged 719 pounds fat and 4,825 pounds milk and the highest seven averaged 269 pounds fat and 7,128 of milk, a difference of 2,303 pounds of milk and 90 pounds of fat.

One of the surprises, at the close of this year's test, was the great difference in the production of cows Nos. 6 and 7. These cows stood side by side in the barn. Both received approximately the same amount of feed and I had always considered both of them excellent cows. Cow No. 6 produced 9,802 pounds milk containing 386 pounds fat. No. 7 produced 4,701 pounds milk containing 176 pounds fat.

A difference of 5,101 pounds milk and 210 pounds fat.

The one produced \$3 for every dollar's worth of feed consumed, the other \$1.40.

Number 6 was a high grade Holstein. The other was a grade shorthorn cow of the dual purpose kind.

Cow No. 6 returned a little more than five times as much net profit in a year as No. 7.

Number 7 was a beautiful looking cow, having an exceptionally large pendulous udder, but not very large milk veins.

A small herd of ten cows like No. 6 will return as much net profit in a year as a herd of fifty-three cows like No. 7.

This is not all of the difference in these cows. Think of the difference in the cost of building and keeping in repair a barn for the ten cows and a barn for fifty-three cows, and the difference in the labor required to feed and milk these two herds. One way for the dairyman to solve the labor problem is to sell his poor cows to the butcher, and keep all good cows but less in number.

Another cow that I had considered a low producer and had at one time thought of selling, produced 5,970 pounds of milk containing 272 pounds fat, her milk averaging 4.55 per cent fat. This cow returned \$2.25 for each \$1 worth of feed consumed.

This only shows how unable we are to distinguish the poor cow from the good one without using the scales and Babcock test.

At the close of the first year's test I sold three of the lowest producing cows. I changed from a summer dairy to an all year dairy. I began studying how to feed a cow a balanced ration. I consulted with the dairy department of the University of Illinois and received much valuable information from same.

I sent to both Washington and Urbana for bulletins along dairy lines. The increase in the production of my herd is due to feeding a balanced ration, as well as to weed out the poor cows and heading the herd with a pure bred sire.

I bought two new cows that produced 298 pounds and 317 pounds fat respectively.

At the close of the second year's test the herd averaged 7,150 pounds milk and 260 pounds fat. An increase of 1,305 pounds milk and 36 pounds fat per cow over the previous year. Only one cow produced less than 200 pounds fat. The lowest one-half of the herd produced 223 pounds of fat within one pound of the average of the whole herd of the previous year—

and the highest one-half produced 298 pounds fat per cow, still showing a difference of 75 pounds of fat per cow between the two halves of the herd.

Two of the lowest producers were again sold and one new cow bought, and three heifers that had been raised were added. The cow that was purchased proved to be a good one producing 6,669 pounds of milk containing 277 pounds of fat.

Of the three heifers added, two proved to be exceptionally good ones. One producing 7,889 pounds milk and 303 pounds of fat. The other producing 8,607 pounds milk and 295 pounds of fat. One of these heifers was a registered Holstein, the other one was a high grade Holstein whose sire was a pure bred Holstein and her dam was cow No. 1, a grade Holstein, having a record of 5,970 pounds of milk containing 272 pounds of fat. These two heifers produced an average of 39 pounds of fat more than the average of the herd the previous year and one pound of fat more than the highest one-half of the herd. These heifers are now matured cows, and have produced 9,999 pounds of milk and 348 pounds of fat and 8,929 pounds of milk and 361 pounds of fat respectively in twelve months. Both of these cows are returning more than \$2 for every dollar's worth of feed consumed. These cows show the value of having a pure bred sire at the head of the herd.

#### **Builds a Silo.**

Three years ago last summer a silo 30 feet deep and 14 feet in diameter was built, eight feet in the ground and 22 feet above the ground. The eight feet in the ground is built of an eight inch brick wall, and above the ground it is built according to the plan of silo described in Bulletin 102.

The silo furnished an abundance of succulent feed, has proven a good investment every year since it was built.

A more nearly balanced return was also fed the following year.

At the close of the third year's test the herd averaged 8,057 pounds of milk and 308 pounds of fat. An increase of an average of 952 pounds of milk and 47 pounds of fat over the second

year's average and an increase of 2,257 pounds of milk and 83 pounds of fat over the first year's average. Every cow in the herd made an increase in fat over the previous year. Cow No. 2 produced 101 pounds of fat over the previous year. Cow No. 6 was not fresh this year and made an increase of 32 pounds of fat over the previous year.

At the close of the third year's test, three of the lowest producers were sold (209 pounds, 269 pounds and 313 pounds of fat) one heifer that had been raised was added to the herd and one cow was purchased, that proved an excellent producer, producing 402 pounds of fat.

At the close of the third year's test the lowest one-half of the herd averaged 266 pounds fat, six pounds of fat more than the whole herd averaged the year before, and the highest one-half averaged 349 pounds fat a difference of 83 pounds of fat.

At the close of the fourth year's test the herd averaged 8,628 pounds of milk and 324 pounds of fat. An increase of 571 pounds of milk and 17 pounds of fat over the third year and an increase of 2,828 pounds of milk and 100 pounds of fat over the first year's test.

This is an increase of \$23 on the net profits per cow over the first year's test. The lowest one-half averaged 280 pounds of fat and the highest one-half averaged 366 pounds of fat a difference of 86 pounds of fat between the highest and lowest one-half of the herd. The lowest cow produced 251 pounds of fat and the highest produced 422 pounds of fat.

At the close of the fourth year's test cow No. 2, one of the best in the herd died. She had produced 11,292 pounds of milk and 375 pounds of fat, the last year of her life. No cows were sold. One new cow was bought. This cow, however, only produced 277 pounds of fat falling below the average of the herd. One heifer was added that produced 227 pounds of fat. This was also below the average of the herd.

Last year one cow that had produced 402 pounds the previous year, produced only 233 pounds of fat due to having been milked too long before freshening. This cow is making an ex-

ceptionally good record this winter, having produced \$4.28 worth of butter per week on \$1.75 worth of feed.

Cow No. 6 did not freshen last year. She had produced 422 pounds of fat the previous year, and then produced 353 last year which was, however, 69 pounds of fat less than last year. This cow was 17 years old and was sold Nov. 2, 1908. She was not in calf. During this cow's last lactation period, beginning Jan. 13, 1907, and ending Nov. 2, 1908—twenty-one months, twenty days, she produced 16,814 pounds of milk and 761 pounds of fat. During the five years she was tested she averaged 8,625 pounds of milk and 374 pounds of fat per year.

On account of the fact that cow No. 2 died, No. 6 not freshening and No. 22 having been milked too long the previous year the average of the herd dropped back to 307 pounds of fat last year. Ten cows that were in the herd last year made an increase of 18.7 pounds of fat over the previous year.

Last fall two cows were sold and one very promising heifer added to the herd. The cows this winter are doing exceptionally well.

#### Care of the Herd.

Unless one cares properly for his cows and feeds them up to their limit, you cannot hope to accomplish very much in the way of raising the average production of the herd.

Neither Colantha 4th Johanna nor Jacoba Irene could have made the records they did if they would not first have received in their feed the protein, carbohydrates and other extract necessary to maintain themselves and produce the milk and butterfat that each cow produced. As much depends on care and feed as upon weeding out the poor cows.

During the winter months cows should be kept in a warm, well lighted, and well ventilated barn. Too much emphasis cannot be placed on good light and good ventilation. They are essential to good health. The best way to ventilate a barn is by the King system. A description of this system is found in "Physics of Agriculture" by Prof. F. H. King of Madison, Wis.



If a cow is to do her best she must be kept comfortable and contented. Professor Haecker says a cow will consume more feed for maintaining herself if kept in comfortable quarters.

A cow producing a large flow of milk must be made to consume a large amount of water daily. Unless she does, she cannot be expected to keep up her flow of milk very long. In order that a cow will consume the necessary amount of water daily, it must not be colder than 48 deg. F. If colder, she will not consume nearly enough. Many times have I observed cows going to a tank containing ice water, drink a small amount of it, and then go away shivering. A cow in this condition will require nearly all her feed to keep her body warm and will have very little left to produce milk. Producing milk under such conditions is like heating our homes with hall doors and windows open.

My cows are turned out to water twice a day, in the morning and in the evening. They go to the spring 10 or 12 rods from the barn. No matter how cold or blustery the weather. They always go to the spring and drink and never shiver or seem cold afterwards. The temperature of this spring water is 48 deg. F. during winter.

#### **Feeding a Balanced Ration.**

Professor Fraser says "A cow cannot give in her product what she does not receive in her feed." A cow weighing 1,000 pounds requires approximately .7 pounds protein, 7 pounds carbohydrates and one pound fat for a maintenance ration. And for every 10 pounds average milk she requires an additional ration of .5 pro., 2.2 pounds carbohydrates and .17 pounds fat. A cow producing 50 pounds of 3.5 per cent milk will require 3.2 pounds protein, 18 pounds carbohydrates and .95 pounds fat.

One mistake many dairymen make is in not feeding enough protein. Nearly all of our crops in Illinois, except clover and alfalfa are high in carbohydrates and fat but low in protein. We must balance up the ration by supplying by-products rich in protein such as oil meal, cottonseed meal and gluten feed. I sell my oats and buy bran, oil meal and gluten feed.

A good ration, beside containing the proper amount of protein, carbohydrates and fat, must be palatable and must be easily digestible. I find that a ration consisting of a variety of concentrates gives better results than one consisting of only one feed.

I am feeding this winter, one pound of oil meal to all of my cows excepting two, which receive about 1 1-3 pounds daily. To the cows producing from seven to eight pounds of fat per week I feed in addition to the oil meal, nine pounds of a mixture of equal parts bran, Buffalo gluten feed, corn and cob meal and ground barley. To cows producing 10 pounds of fat per week I feed about 12 pounds of the mixture and 1 1-3 pounds of oil meal. To cows producing less than seven pounds of fat per week I feed less grain. Cows when dry, receive no grain ration.

For roughage, I am feeding 30 to 35 pounds silage, eight pounds mixed hay and about five pounds corn stover.

In order to be successful dairymen, we must study the individual needs of each cow. Some cows are much more economical producers than others. I weigh the milk from the whole herd daily. Whenever the flow begins to drop off, I begin to look for the cause.

In order to make the most profit out of our herds the flow of milk must be constantly kept up. If cows once drop down for any length of time, they will not come up again to where they were during that lactation period. The good dairyman, like the good engineer, must constantly keep his hand upon the throttle.

#### Value of a Good Sire.

Cow No. 21 is a daughter of cow No. 14, whose average production for four years was 7,614 pounds of milk and 246 pounds of fat. The sire of cow No. 21 was a full blood Holstein. This cow produced during her first lactation period 7,554 pounds of milk and 254 pounds of fat. Last year she produced 7,570 pounds milk and 272 pounds of fat. She dropped her third calf on Sept. 4, 1908, and produced during the first five months of this lactation period an average of 9.17 pounds fat per week. A gain of 28½ per cent over the corresponding period last year.

If she continues to do as well for the balance of the year she will produce 350 pounds of fat this year. An increase of 104 pounds of fat per week over the four years' average of her dam.

Cow No. 17 was sired by the same bull as cow No. 21. This cow produced last year—her third lactation period—8,929 pounds milk and 361 pounds of fat. In her first lactation period she produced 7,889 pounds of milk and 303 pounds of fat during twelve months. During her second lactation period she produced 8,877 pounds of milk and 345 pounds of fat, in twelve months. Her last year's record exceeds her dam's record for one year by 2,959 pounds of milk and 89 pounds of fat. She produced an average of 348.4 pounds of milk and 13.24 pounds of fat per week on pasture alone last June.

Another heifer produced an average of 8.6 pounds of fat a week during five months of her second lactation period this winter, and is doing well now.

Now let us see what this improvement amounts to.

Cows Nos. 1 and 14 returned an average net profit of \$50 each, per annum. Their daughters returned an average net profit of \$85 each. An increase in the net profit of an average of \$35 per annum each over the net profits of their dams. An increase of 70 per cent. A herd of 20 cows like these daughters are equal to a herd of 34 cows like their dams.

In order that heifers may develop into profitable cows, they must not only be well bred, but also well reared. They must be well nourished on nitrogenous food and kept in clean dry quarters from birth to maturity.

Unless we give the young calf the proper care and nourishment that it needs to develop, we need not look for much improvement in our dairy herds.

The most valuable feed for calves is skim milk, alfalfa and clover hay and silage.

#### **Does It Pay to Feed Good Cows?**

One question very frequently asked me is "Does it pay to feed cows the way you do?" or some one will tell me "Figure what you feed into your cows and you have very little left."

Now let us see! After carefully weighing the feed to my cows, I find that I am feeding \$17.50 worth of feed to twelve cows per week.

These twelve cows return \$96.25 per week in butterfat alone.

These twelve cows produced approximately 2,400 pounds of skim milk per week. This at 25 cents per cwt. is worth \$6, making the total receipts \$42.25 per week, a net profit of \$24.75 over the cost of keeping these cows. These cows returned \$2.45 for every dollar's worth of feed consumed.

My herd averaged 307 pounds of fat per cow last year.

This is equivalent to 358 pounds of butter, which at an average price of 32½ cents per pound, is worth \$116.35. At 25 cents per cwt. the skim milk is worth \$20 per cow, which makes a total receipt of \$136.35 per cow per year.

It costs me an average of \$52 per cow for feed for a year, leaving a net profit of \$84.35 per cow per year.

The herd returned \$2.62 for every \$1 worth of feed consumed.

The best one-half of the herd averaged 350 pounds of fat, which is equivalent to 408 lbs. of butter, worth \$132.60. The skim milk averaged \$24 per cow, making a total of \$156.60 per cow per year. Allowing that the best one-half of the herd consumed \$10 worth of feed more than the poorest one-half, the best one-half returned a net profit of \$99.60 per cow per year.

The best one-half returned \$2.75 for every \$1 worth of feed consumed.

#### **Stepping Stones to Successful Dairying.**

1. Weed out the poor cows by means of the scales and Babcock test.
2. Feed the good cows a balanced ration.
3. Grow alfalfa and provide an abundance of silage.
4. Head the herd with the best sire obtainable.
5. Raise the heifer calves from the best cows.
6. Continue to weed, feed and breed.

## SECRETARY'S REPORT.

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Geo. Caven.

With the auxiliary meetings, report of which appears elsewhere, in addition to the annual convention, the association had a busy year and one that shows gratifying results.

Reports of the auxiliary meeting all told of successful gatherings and at each place the hope was expressed that the association would again favor the farmers in that vicinity with another meeting.

We also have received reports of the good resulting from these meetings at each place. The results are seen in the growing interest in dairying, the building of silos, the additions to herds and the ever growing interest in the study of cows with a view of weeding out those that are not profitable.

Clinton, where the annual convention was held last January, is a striking example of good results attending the work of the association. Those who were interested in starting a creamery at Clinton figured that there would be nothing like an annual convention of the State Dairymen's Association to arouse interest. They, therefore, raised the necessary money for expenses and made other arrangements that met the wishes of the officers of the association. The creamery had been opened a short time before the dates for the convention and at the time of the meeting had only about fifteen patrons and made a very small amount of butter. In June this creamery had over 100 patrons and reached as high as 1,000 pounds of butter a day and in August it moved into a new building erected and arranged for creamery purposes. This factory is now on a firm footing, is making money and the dairy business is growing in that vicinity.

The extra meetings made larger expense, but the association's appropriation is larger to meet this expense. One item of expense that appears mainly in the cost of postage was the issuing of a dairy bulletin containing good matter for dairymen. This

bulletin was sent out under one cent postage to more than 12,000 dairymen in the state. We also mailed about 350 copies of the annual report at 11 cents each, and sent out 800 programs and other matter when preparing for the annual convention. Other expenses were moderate considering the work accomplished. The statement of receipts and expenses by the Secretary exclusive of the annual appropriation from the legislature and which was turned over to the Treasurer, is as follows:

### Receipts.

Check from Treasurer .....	\$200.00
Memberships .....	102.00
Mayor of Clinton .....	200.00
A. H. Barber, Creamery Supply Co.....	20.00
Diamond Crystal Salt Co.....	10.00
Creamery Package Mfg. Co.....	25.00
Blanke & Hauke.....	10.00
International Salt Co.....	20.00
DeLaval Separator Co.....	35.00
Elgin Butter Tub Co.....	10.00
Wells & Richardson Co.....	15.00
Vermont Farm Machine Co.....	25.00
Sharples Separator Co.....	20.00
Worcester Salt Co.....	10.00
D. H. Burrell & Co.....	10.00
Chr. Hansen's Laboratory.....	10.00
International Harvester Co. of America.....	10.00
Merrill & Eldredge, Chicago (sales of butter).....	108.11
Geo. Caven (sale butter).....	5.40
E. Sudendorf (sale butter).....	3.75
A. A. Jennings (sale butter).....	2.80
J. B. Ford Co.....	20.00
Empire Cream Separator Co.....	5.00
Check from Treasurer to balance.....	25.79
<hr/>	
Total .....	\$902.85

## Expenses.

Express and drayage .....	\$ 19.95
Telegrams .....	2.13
Telephone .....	2.45
Exchange .....	.30
Stamps .....	189.96
Traveling .....	24.62
Envelopes (reports and programs) .....	7.58
Labor .....	5.00
Miscellaneous .....	5.45
Signs .....	4.50
Dairy show booth.....	9.50
Distributing advertising matter, Clinton .....	4.00
Display rooms and Superintendent's expenses, Clinton..	29.50
Hotel and Speakers expenses.....	90.00
Paid Treasurer Meyer.....	497.46
Half-tone for report.....	1.75
Dairy show sign.....	5.00
G. W. Ingersoll (printing).....	3.25
May 15th, telephone.....	.45
Total .....	<hr/> \$902.85

Approved Aug. 18, 1909.

LEWIS N. WIGGINS,  
CHAS. T. GILKERSON,  
E. SUDENDORF.

Three thousand copies of the annual report were printed and distributed.

Preparations for the annual convention are begun two months prior to the meeting. The association prints a program, the cost of which is borne by and some surplus derived from the advertising carried. The other source of income, aside from the state appropriation, is from memberships and contributions made by dairy supply firms to the premium fund. Last year the receipts from

all sources was liberal, but the membership is not as large as we should have when we consider the magnitude of the dairy interest in the state. The convention, however was a success in every particular.

The features of the meeting, besides the program of addresses and discussions were the butter judging contest, the milk and cream test and the butter exhibit. In these contests cash prizes were offered.

In butter judging, 10 tubs were selected and were first scored by the three expert judges and their average score was taken as representing the best judgment on the quality of the butter. Then the contestants were each permitted to score the butter and the nearest to the judge's score settled the contest. Chas. Foss of Cedarville, was first; Carl Lund of Urbana, second; S. L. Murphy, Gardenplain, third, and B. K. Peters, Dallas City, fourth.

The milk and cream contest brought quite a few entries. Those who took part signed the following entry blank after it had been properly filled out:

Dairy meeting and milk and cream contest Clinton, Ill., Jan. 19-20-21, under the direction of the Illinois State Dairymen's Association.

**Official Entry Blank.**

**Class I.—Market Milk (Raw.)**

P. O. Address \_\_\_\_\_ Date, \_\_\_\_\_, 1909.

George Caven, Sec.,  
154 Lake Street,  
Chicago, Ill.

Please enter for me one quart of milk to compete for prizes offered by the Illinois State Dairymen's Association in accordance with the conditions herein prescribed.

(Signed) \_\_\_\_\_



Rules. (1) Exhibitors are allowed to make only one entry in each class.

(Signed) \_\_\_\_\_

(Proprietor) \_\_\_\_\_

#### How to Compete.

Milk to compete for prizes must be sent by express or otherwise from station nearest the producer direct to George Caven, Secretary, Clinton, Ill., or brought to convention by exhibitor.

The package should be plainly addressed on outside; a card should also be tacked on box inside, giving plainly sender's name and address, so as to avoid mistakes in identifying packages.

#### Questions To Be Answered by Exhibitors.

1. Give date and hour when this milk was drawn from the cow \_\_\_\_\_
2. Give place, date and hour at which this milk was delivered to the express company or otherwise shipped, \_\_\_\_\_
3. Does the milk fairly represent the average product of your herd in quality and cleanliness? \_\_\_\_\_

NOTE:—Class 2 is certified milk; Class 3 market cream; Class 4 certified cream. One pint of cream constitutes an entry. Use same entry blank and change name of class and quantity to suit the class entered.

In the contest, F. L. Gaston of Normal, scored highest on market cream and Thos. Foster of Springfield highest on certified milk and cream and market milk. The report on the score and bacteria content of the samples was as follows:

Urbana, Ill., Jan. 22, 1909.

Mr. Geo. Caven, Secretary.

Dear Sir:—

The following is the report of the work done by the Bacteriologist on the Milk and Cream Exhibit, at Clinton:

BACTERIA CONTENT.	SCORE.
a <sub>1</sub> 83,700.....	96.5
a <sub>3</sub> 5,750 .....	96.
a <sub>4</sub> Not a single germ developed.....	95.
a <sub>5</sub> 7,700 .....	97.5
a <sub>6</sub> 21,500.....	97.
a <sub>7</sub> 482,700.....	83.
B <sub>1</sub> 17,500.....	96.5
B <sub>2</sub> 1,095,800.....	93.
D <sub>1</sub> 15,800.....	97.
E <sub>1</sub> 1,099,000.....	94.
20 9,640.....	89.

C. E. LEE,

University of Illinois.

In the butter exhibit Ferdinand Grimm, Chadwick Creamery, was highest with a score of 94½. All scores at 90 and above participated in the pro rata purse and they included the following:

Wm. Bramstedt, Mascoutah, Ill.....	90 2-3
M. L. Musselman, Lanark.....	92 2-3
A. D. McCready, Argyle.....	93
J. F. Westphall, Woodstock, R. No. 3.....	91.9
H. Jacobson, Nokomis.....	93 1-3
Robt. Moren, Morrison.....	92 1-3
Wm. Englebrecht, Fairhaven.....	93
Louis Nielsen, Camp Point.....	92 1-2
Ferdinand Grimm, Savanna, R. No. 2.....	94 1-2
N. A. Petersen, Sigel.....	91 1-3
Geo. Aler, Rockefeller.....	91 2-3
Fred J. Weddidge, Big Rock.....	91 1-4
W. H. Welch, Flora.....	91.1
S. L. Murphy, Garden Plain.....	92 1-3
D. C. Benton, Kaneville.....	93.1
B. K. Peter, Dallas City.....	93 2-3
Geo. Simonson, Urbana.....	94

Geo. Bloyer, Harper.....	93 1-3
H. R. Duell, Savanna .....	91 1-3
A. A. Adams, Harvard.....	93
Mrs. Wm. C. Bereiter, Zion City.....	90
R. H. Pennington, Plainfield.....	90
Chas. Foss, Cedarville.....	91

The association had an arrangement with the dairy school, Illinois College of Agriculture, whereby those taking the work in dairying at the two weeks' winter convention in the dairy school would be entitled to certificates as cow testers from the association. Those reported to have completed the course last winter are: J. A. Love, Roscoe, Ill.; Prof. C. W. Farr, Chicago; Madison Bullock, Maysville, Ky.; J. B. Fitch, Alto Pass, Ill.; Herbert Conklin, Roscoe, Ill.; Chas. R. McMillan, Sparta, Ill.; L. R. Hendrickson, Danville, Ill.; E. A. White, Clinton, Ind.; H. A. DeWerff, Farina, Ill.; Carl C. Ackert, Dixon, Ill.; Herbert R. Kiltz, Woodstock, Ill.; E. C. Bruer, McDowell, Ill.; Roy E. Morris, Pecatonica, Ill.; B. H. Ames, Kaneville, Ill.

### TREASURER'S REPORT.

Adolph Meyer, Highland, Ill.

#### RECEIPTS.

July 1, 1908.	Balance on hand .....	\$ 754.72
Aug. 6, 1908.	From Geo. Caven for State appropriation.....	2,500.00
Jan. 28, 1909.	From Geo. Caven .....	152.35
Feb. 10, 1909.	From Geo. Caven .....	101.00
Feb. 12, 1909.	From Geo. Caven .....	80.00
Feb. 22, 1909.	From Geo. Caven .....	128.11
Mar. 6, 1909.	From Geo. Caven .....	11.00
Mar. 16, 1909.	From Geo. Caven .....	20.00
Mar. 29, 1909.	From Geo. Caven .....	5.00
		\$3,752.18
Total cash for year to July 1.....		\$3,752.18
Total disbursements to July 1.....		3,009.07
Balance on hand .....		\$ 743.11

## DISBURSEMENTS.

1908.		Voucher No.	
May 8.	Ad. Meyer, Highland meeting.....	1121	\$6.70
June 24.	Geo. Caven, balance of expenses for year..	1124	66.20
June 24.	Lowrie & Black, expenses sending out reports .....	1125	28.13
June 24.	Louis Nielson, meeting Camp Point.....	1126	6.00
July 2.	Carl E. Lee, expenses Camp Point.....	1127	10.36
July 2.	C. C. Hayden, expenses, Camp Point.....	1128	9.48
July 2.	B. A. Fillmer, sale of butter at Marengo..	1128	5.50
July 2.	Ad. Meyer, Highland meeting.....	1130	7.00
Aug. 14.	M. S. Campbell, expenses Peoria meeting..	1132	14.82
Oct. 5.	L. N. Wiggins, expenses Chicago auditing accounts and expenses Springfield meeting .....	1133	22.75
Oct. 5.	L. N. Wiggins, Springfield meeting.....	1134	50.11
Oct. 5.	Geo. Caven, Springfield meeting.....	1135	20.00
Oct. 23.	Illinois State Board of Agriculture, premium State Fair .....	1136	65.00
Oct. 23.	The R. H. Armbruster Mfg. Co., rent for tent .....	1137	33.50
Oct. 23.	Geraghty & Co., expenses for buttons.....	1138	6.00
Oct. 30.	Illinois State Board of Agriculture, prizes for milk, State Fair .....	1139	15.00
Oct. 30.	A. F. Jansen, expenses State Fair meeting .....	1140	7.90
Oct. 30.	M. S. Campbell, expenses State Fair meeting .....	1141	12.81
Oct. 31.	Chicago Produce Co., cuts in report, 1908...	1142	18.00
Nov. 10.	Geo. Caven, Secretary, one-half salary, 1908-1909 .....	1143	150.00
Nov. 10.	The Elgin Dairy Report, 10 M. envelopes for booklets .....	1144	14.00
Dec. 7.	Geo. Caven, Secretary, mailing 15 M. booklets at 1c and 500 reports at 10c.....	1145	200.00
Dec. 29.	Lowrie & Black, publishing 3 M. reports....	1146	745.55
Dec. 29.	Elgin Dairy Report, printing 15 M. eight page booklet and 7 M. envelopes.....	1147	48.50
1909.			
Jan. 25.	Journal Printing Co., printing two colored posters .....	1148	21.50
Jan. 25.	Geraghty & Co., badges for Clinton.....	1149	63.00
Jan. 25.	G. W. Ingersoll, 500 circular letters.....	1150	3.75
Jan. 25.	The Public Printing Co., 500 programs and 250 score cards .....	1151	5.50
Jan. 25.	N. P. Hull, expenses Clinton convention..	1152	\$20.93
Jan. 25.	J. F. Sanmann, expenses Clinton convention	1153	10.10

Jan. 25.	Jno. Crawford, butter judge, Clinton convention .....	1154	12.00
Jan. 27.	Chas. Gilkerson, expenses Clinton convention .....	1155	11.53
Jan. 27.	Jos. Newman, expenses Clinton convention .....	1156	10.00
Jan. 27.	W. J. Fraser, expenses Clinton convention .....	1157	5.44
Jan. 27.	Elgin Dairy Report, 800 programs, 800 entry blanks .....	1158	45.00
Jan. 27.	C. H. Eckles, expenses Clinton convention .....	1159	24.00
Feb. 6.	Frank Clegg, butter judge, Clinton convention .....	1160	10.00
Feb. 6.	L. N. Wiggins, Peoria and Clinton convention .....	1161	19.40
Feb. 6.	Alice Donahue, stenographer Clinton convention .....	1162	25.00
Feb. 6.	J. G. Lombard, expenses Clinton convention .....	1163	30.00
Feb. 16.	S. B. Shilling, expenses Clinton convention .....	1164	8.50
Feb. 16.	Gorman Orchestra, expenses Clinton convention .....	1165	15.00
Feb. 16.	E. H. Farrington, expenses Clinton convention .....	1166	25.15
Feb. 19.	F. A. Jorgenson, expenses Clinton convention .....	1167	7.04
Feb. 19.	W. W. Hepburn, expenses Clinton convention .....	1168	2.54
Feb. 19.	Carl E. Lee, expenses Clinton convention ..	1169	11.35
Feb. 19.	C. J. Rohrer, expenses Clinton convention ..	1170	8.92
Feb. 19.	Wm. Bramstadt, butter premium; butter at Clinton .....	1171	9.45
Feb. 19.	M. S. Musselman, premium Clinton convention .....	1172	9.25
Feb. 19.	A. D. McCready, premium and butter, Clinton convention .....	1173	15.20
Feb. 19.	J. F. Westphall, premium and butter, Clinton convention .....	1174	22.85
Feb. 19.	H. Jacobson, premium and butter, Clinton convention .....	1175	16.20
Feb. 19.	Robt. Moren, premium Clinton convention ..	1176	8.25
Feb. 19.	Wm. Englebrecht, premium and butter, Clinton convention .....	1177	17.80
Feb. 19.	Louis Nielsen, premium and butter, Clinton convention .....	1178	13.95
Feb. 19.	Ferdinand Grimm, premium and butter, Clinton convention .....	1179	20.20
Feb. 19.	N. A. Peterson, premium and butter and third milk testing, Clinton convention...	1180	18.60
Feb. 19.	Geo. Aler, premium .....	1181	6.75

Feb. 19.	Geo. W. Hoppensteadt, premium and butter .....	1182	6.20
Feb. 19.	Fred J. Weddidge, premium and butter....	1183	12.25
Feb. 19.	E. C. Dodge & Co., premium and butter....	1184	7.70
Feb. 19.	W. H. Welch, premium and butter.....	1185	13.30
Feb. 19.	S. L. Murphy, premium and butter( butter judging) .....	1186	23.70
Feb. 19.	P. C. Benton, premium and butter.....	1187	15.70
Feb. 19.	B. F. Peter, premium and butter (milk testing, butter judge) .....	1188	36.95
Feb. 19.	Geo. Simonson, premium .....	1189	12.50
Feb. 19.	Geo. Bloger, premium .....	1190	11.01
Feb. 19.	H. R. Duell, premium and butter.....	1191	11.20
Feb. 19.	A. A. Adams, premium and butter.....	1192	15.20
Feb. 19.	Mrs. W. C. Bereiter, premium and butter..	1193	3.75
Feb. 19.	R. H. Pennington, premium and butter....	1194	3.75
Feb. 19.	Eli I. Crosior, premium and butter.....	1195	3.75
Feb. 19.	L. E. Mackey, premium and butter.....	1196	2.50
Feb. 19.	Chas. Foss, special premium 1st. butter judge .....	1197	30.00
Feb. 19.	H. D. Remington, 1st prize milk testing....	1198	20.00
Feb. 19.	Carl Lind, 1st prize milk testing; 2nd prize butter .....	1199	20.00
Feb. 19.	Thos. Foster, 1st prize market milk; 2nd market cream and 1st certified milk and cream .....	1200	\$18.00
Feb. 19.	F. L. Gaston, 3rd prize market milk; 1st prize market cream .....	1201	7.00
Feb. 19.	J. R. Biddulph, 1st prize full cream cheese; 1st prize special make .....	1202	12.00
Mar. 5.	Geo. Caven, Second half salary for 1908-1909. Expenses of Geo. Caven and E. Sudendorf at Rockford, Directors meeting .....	1203	162.90
Mar. 5.	L. N. Wiggins, expenses Directors' meeting at Rockford .....	1204	16.80
Mar. 5.	Carl E. Lee, expenses Directors' meeting..	1205	11.98
Mar. 5.	A. F. Jansen, expenses Directors' meeting and Clinton convention .....	1206	26.24
Mar. 5.	Harry S. Hogue, premium and butter....	1207	18.10
Apr. 5.	J. B. Newman, expenses at Springfield....	1	13.45
Apr. 5.	S. B. Shilling, auxiliary meetings; Effingham, Sigel, Altamont, Montrose .....	3	24.50
Apr. 5.	Geo. Caven, traveling expenses .....	4	38.50
Apr. 5.	O. Erf, expenses Clinton convention .....	5	28.00
Apr. 5.	E. Emma Higinbotham, stenographer and expenses .....	6	84.37

Apr. 5.	Chas. Gilkerson, expenses auxiliary meetings at Union and Marengo .....	7	6.75
Apr. 6.	A. F. Jansen, expenses arranging and conducting auxiliary meetings at Sigel, Effingham, Altamont and Montrose .....	8	20.44
May 12.	Elgin Dairy Report, printing checks and stationery .....	9	13.25
May 12.	Lowrie & Black, boxing and shipping reports .....	10	23.58
May 12.	W. W. Marple, expenses auxiliary meeting at Union and Marengo .....	11	15.00
May 12.	J. F. Sanmann, Rockford, Directors' meeting and auxiliary meeting at Lewiston..	12	38.45
June 15.	The Journal Printing Co., express printed bills and printing banquet tickets.....	13	3.50
June 30.	Carl E. Lee, expenses auxiliary meeting at Altamont and Montrose .....	14	11.05
June 30.	Geo. Caven, balance accounts for year ending July 1, 1909 .....	15	25.79
June 30.	L. N. Wiggins, legislative expenses .....	16	22.50
	Balance July 1, 1909 .....		743.11
			<hr/>
			\$3,752.18

Approved Aug. 18, 1909.

LEWIS N. WIGGINS,  
CHAS. T. GILKERSON,  
E. SUDENDORF.

### SECRETARY'S REPORT.

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For 1907-08.

To the Directors:

I hereby submit my report of money received and paid out and of the business of the Association for the year closing with July 1st, 1908:

### EXPENSES.

Stamps .....	\$ 54.50
Sending out 510 copies of the Association's annual report at 11c...	56.10
Express and cartage .....	18.41
Telephone .....	1.25
Traveling .....	49.86
Telegrams .....	.73

Printing news letters and labor of folding and mailing reports....	10.00
Envelopes for reports and programs .....	9.88
Stenographer expenses .....	12.50
Janitor, Machinery hall, Marengo .....	4.00
Republican-News, Marengo .....	7.00
Rent, Opera house, Marengo .....	50.00
Rent of stove, Marengo .....	1.25
J. H. Patterson Co., fuel, Marengo .....	.75
O. C. Cregg, advance on expenses .....	25.00
Music, Marengo .....	8.00
Rent, Machinery hall, Marengo .....	10.00
Signs, Marengo .....	7.75
Rent, piano, Marengo .....	1.00
Thos. Diamond (carpenter work and erecting signs), Marengo....	7.75
Score cards .....	1.00
J. R. Biddulph (cash advanced).....	10.00
Forwarded Adolph Meyer, Treasurer .....	512.91
Expenses, officers and speakers, Marengo .....	59.50
Butter trier (prize) .....	3.00
Posters put up at Rockford .....	.75
Miscellaneous .....	1.15
<b>Total .....</b>	<b>\$924.04</b>

### RECEIPTS.

Check from Treasurer .....	\$ 64.00
Check from Treasurer .....	40.00
A. H. Barber Creamery Supply Co. ....	25.00
Memberships .....	120.00
Chas. Gilkerson, for Marengo .....	251.00
Wells & Richardson Co. ....	20.00
DeLaval Separator Co. ....	40.00
Chr. Hansen's Laboratory .....	10.00
Diamond Crystal Salt Co. ....	10.00
Sharples Separator Co. (Chicago) .....	10.00
Worcester Salt Co. ....	10.00
Elgin Butter Tub Co. ....	10.00
International Salt Co. ....	20.00
Creamery Package Manufacturing Co. ....	35.00
D. H. Burrell & Co. ....	10.00
Vermont Farm Machine Co. ....	35.00
J. B. Ford Co. ....	20.00
Elov Ericsson .....	5.00
W. S. Moore & Co. (butter) .....	45.36
Cash (butter) .....	53.85
Balance, C. T. Gilkerson .....	.45
Illinois Buttermakers' Association .....	.63
Check from Treasurer .....	66.20



International Harvester Co. ....	10.00
Sharples Separator Co. (West Chester, Pa.) .....	9.80
C. M. Waite (returned) .....	2.75
<b>Total</b> .....	<b>\$924.04</b>

In order to advertise the Marengo meeting we had printed and circulated 1,000 programs, 1,000 entry blanks and 1,000 posters. These were sent to the creameries and milk factories of the state and to members of the association, with the request that they put up the posters in conspicuous places and hand the programs to others who might be interested after they had familiarized themselves with its contents.

We also, for six weeks prior to the convention got out a news letter in regard to the coming meeting each week and sent it to from 75 to 100 papers throughout the state. This extensive advertising increased the postage expense of the year, but it doubtless gave many a knowledge of what the association was doing which they would otherwise not have had.

#### State Fair Meeting.

The extra work done by the association last year also increased the expenses. We held six auxiliary meetings during the year. The first was at the state fair, where the association had a dairy tent as a meeting place for dairymen. We also did what we could to encourage the exhibiting of butter and milk in the dairy building at the fair and in encouraging the dairy cattle exhibition. Following the custom of several years, the dairymen's association offered special prizes in different dairy cattle classes, these prizes consisting of cash and gold medals. Winners of the cash prizes were:

F. P. Knowles, Auburn, Mass., Holstein-Friesian cow, 3 or over.....	\$ 5.00
Pierson Stock Farm, Hadley, Mich. H. F. heifer under 3.....	5.00
Thos. W. Lawson Co. Farm, Scituate, Mass., Jersey cow, 3 or over..	5.00
J. F. Latimer, Abingdon, Ill., Jersey heifer, under 3.....	5.00
W. P. Schanck, Avon, N. Y., Ayrshire cow, 3 or over.....	5.00
Geo. H. McFadden, Bryn Mawr, Pa., Ayrshire heifer, under 3.....	5.00
Springdale Breeding Co., Indianapolis, Ind., brown Swiss cow, 3 or over .....	5.00

Springdale Breeding Co., Indianapolis, Ind., brown Swiss heifer, under 3 .....	5.00
M. D. Cunningham, Kansasville, Wis., Guernsey heifer under 3.....	5.00
M. D. Cunningham, Kansasville, Wis., Guernsey heifer under 3....	5.00
F. R. Sanders, Bristol, N. H., Dutch belted cow, 3 or over.....	5.00
A. W. Dopke, N. Milwaukee, Wis., milking red Polled cow, 3 or over.	5.00
Geo. B. Buck, Sunny Hill, Ill., milking red Polled heifer under 3....	5.00
Total .....	\$65.00

Gold Medals were given as follows:

- Lot 95—Cow 3 years old or over. To: A. W. Dopke, N. Milwaukee, Wis.,  
on red Polled cow, Olena.
- Lot 96—Heifer under 3. To: Geo. H. McFadden, Bryn Mawr, Pa.,  
Ayrshire cow Maggie, 2nd.
- Lot 97—Holstein-Friesian cow 3 or over. Best position in butter test.  
To: F. P. Knowles, Auburn, Mass., on Fannie De Kol 2nd  
42915.

We also offered special prizes on milk and cream and the entries were tested at the laboratory of the State Board of Health and by the State Chemist. The entry of L. N. Wiggins, from his dairy farm at Springfield, won the highest score.

### Other Auxiliary Meetings.

In March the Association held dairy meetings at Havana, Washington, Highland and Effingham. The arrangement for the Havana meeting was made by J. F. Sanmann. Addresses were delivered by Professors W. J. Fraser, C. C. Hayden and Carl E. Lee of the State Dairy School, University of Illinois. Prof. Fraser discussed the Dairy Cow from charts and figures, detailing investigations carried on at the dairy school and by the school in the state. He showed the profitable and unprofitable dairy cow and how easy it is to know the difference. He showed the immense losses the farmers are unconsciously suffering every year because of the number of unprofitable cows in their herds. He showed that the difference in the cost of feeding the profitable and unprofitable cows is slight compared to the wide difference in returns. He also showed how easy it was to build up herds to a profit basis and emphasized the absolute necessity of a pure bred sire in this business of building up the

herds. Prof. Fraser's address was along the same line as given elsewhere in this report.

Prof. Hayden discussed feeds and feeding. He had charts showing the composition of feeds and explained how necessary it was that cows get plenty of certain elements and explained about compounding rations to give the proper feed. Mr. Hayden urged the growing of cow peas or alfalfa because of the large amount of protein in these feeds and had interesting discussions at each meeting place on the growing of alfalfa. It was evident that the growing of this crop is not yet well understood in the sections where the meetings were held. At every meeting close attention was given to the discussion of feeds and many questions were asked, all of which Prof. Hayden answered.

Prof. Carl E. Lee spoke on the "Care of Milk." He showed how easy milk can be contaminated by letting it stand in the barn, by keeping it in a milk house that is located near a hog lot or some other source of foul odors and which will get into the milk. He explained how easily and frequently milk is contaminated by unclean tinware and explained how tinware and all utensils that come in contact with milk should be cleaned. He explained what cleanliness in milking is and the necessity of being clean and careful in all work about the cow from which there might come some contamination to the milk. He explained how bad bacteria can come from dust in the barn, from the hair and dirt that might fall from the cow during milking and the many other ways milk is contaminated. Prof. Fraser had a lot of questions to answer.

Prof. Fraser was at the Havana and Washington meetings. At Highland Prof. Hayden discussed both the feeding question and that of building up the herds. Secretary Caven gave a short talk on the growing demand for highest quality in dairy products. At Effingham Vice President J. P. Mason and Professors Hayden and Lee were the speakers. Vice President Mason presided at the Effingham meeting, the arranging for which had been done by A. F. Jansen of Effingham. Mr.

Mason talked on "Successful Dairying" from the standpoint of a successful dairyman. He told his own experience and practices as carried on at his own farm and the results. His address consisted largely of answers to questions about feeding, selecting cows, etc., which were asked by the dairymen present.

The Washington meeting was arranged by Joseph Morris of that place and the Highland meeting by Adolph Meyer of Highland and Greenville.

The meetings were encouraging, but coming as they did just when farmers could get into the fields to plant oats, the attendance was not as large as it otherwise would have been.

The last of the series of auxiliary meetings was held at Camp Point June 13th, and took the form of a Dairy and Creamery picnic. Arrangements were made by Louis Nielson, buttermaker at the Creamery there, and speakers on the program for the State Association were: President L. N. Wiggins, Prof. Carl E. Lee and Prof. C. C. Hayden.

#### **Meetings of Directors.**

Directors and other officers of the Association met at the 1907 State Fair, where the Association maintained headquarters. At a business meeting in the dairy tent it was decided to let the matter of locating the meeting to a committee consisting of President L. N. Wiggins, Secretary Geo. Caven and Director M. S. Campbell. The affairs of the association were discussed and the plan of operating a dairy train, if proper arrangements could be made with the railroads was approved and the Secretary was instructed to correspond with railroad officials in regard to the matter. The plan of having a headquarters at the State Fair was approved and the belief was expressed that after a few efforts in that direction, the dairy interests at the fair could be brought to a central point and increase the dairy feature of the fair.

The regular annual business meeting of the directors held in connection with the State Farmers' Institute meeting was held in Peoria during the Institute Convention. Vice President

J. P. Mason presided and Directors M. S. Campbell, Carl E. Lee, J. F. Sanmann, A. F. Jansen, Treasurer Adolph Meyer and Secretary Geo. Caven were present. Louis Nielson and Geo. Caven represented the buttermakers' association and the first question to be considered was the uniting of the State Dairymen's Association and Illinois State Buttermakers' Association. After a thorough discussion of the subject, the following resolution was presented and accepted:

*Resolved*, That the Illinois State Dairymen's Association and the Illinois State Buttermakers' Association do unite under the name Illinois State Dairymen's Association. That the Illinois State Buttermakers' Association be given a buttermaker or a representative of the buttermakers on the board of directors of Illinois State Dairymen's Association and that the programs at annual meeting be prepared so as to give the buttermakers due recognition.

This resolution was accepted. During the discussion the matter of changing the name of Illinois State Dairymen's Association to include the word, "Buttermakers," was discussed and various objections were raised, one being that a change of name might complicate matters in connection with the annual appropriation from the state which is made to Illinois State Dairymen's Association.

The general and in fact unanimous opinion of all at the meeting was that there should be only one association in the state and that there should be no friction between the dairymen and buttermakers; that the association can represent the whole interest in Illinois and give each division proper recognition.

Two representatives of the business men's association of Peoria appeared before the directors and urged Peoria as the meeting place for the next convention of Illinois State Dairymen's Association.

The matter of locating the next meeting place was placed in the hands of the Secretary to investigate the various locations offered and report at the meeting to be held in Springfield during the State Fair.

Directors proceeded to the election of a Treasurer and Secretary and on motion duly made and seconded the Secretary was instructed to cast a ballot for Adolph Meyer and he was duly declared elected Treasurer. On motion the Vice President was instructed to cast a ballot for Geo. Caven for Secretary for the ensuing year and he was duly declared elected.

The question of holding auxiliary dairy meetings during the year was brought up and discussed and the decision reached, that in this way the association could extend its work. On motion President L. N. Wiggins, Director Carl E. Lee, and Secretary Geo. Caven were appointed to arrange such meetings.

The Treasurer and Secretary made partial reports of the business of the year and on motion President Wiggins and Director Campbell were appointed a committee to approve the reports of the Secretary and Treasurer when the business of the year was completed and the reports ready for publication.

President Wiggins and Secretary Caven were authorized to receive bids and let the contract for printing the annual report, containing the proceedings of the Marengo convention.

Special premiums offered by the Association at the 1907 State Fair were approved and on motion made, seconded and passed, it was decided to repeat the premium offers at the 1908 State Fair, also to maintain headquarters and carry out such program as seemed advisable.

There being no other business the meeting adjourned.

GEORGE CAVEN, Secretary.

Approved Aug. 14, 1908.

LEWIS N. WIGGINS,

M. S. CAMPBELL.

## TREASURER'S REPORT.

1907-1908.

## EXPENSES.

1907.	To Whom Paid.	Object.	Voucher No.	Amount.
Sept. 24.	J. E. Hatfield, premiums offered by Association State Fair .....		1035	\$15.00
Sept. 24.	C. F. Stone, premium offered by Association State Fair .....		1036	15.00
Sept. 24.	Elgin Dairy Report, programme State Fair, 1907 .....		1037	30.00
Sept. 24.	Chicago Produce Co., cuts in annual report		1038	30.41
Sept. 24.	Geo. Lauterer, badges (500) State Fair, 1907 .....		1039	20.00
Oct. 4.	O. C. Gregg, extra matter for annual report .....		1040	15.00
Oct. 4.	Geo. Caven, expenses preparing meeting at Springfield State Fair, postage, traveling, etc. ....		1041	64.00
Oct. 26.	Illinois State Board of Agriculture, State Fair premiums .....		1042	65.00
Oct. 26.	Geo. Caven, one-half salary as Secretary, 1907-1908 .....		1045	100.00
Oct. 28.	L. N. Wiggins, State Fair meeting, stenographer .....		1044	69.25
Nov. 20.	A. F. Jansen, Springfield State Fair meeting expenses .....		1045	5.00
Nov. 20.	W. E. Jones, Springfield State Fair meeting expenses .....		1046	10.80
Nov. 20.	W. E. Campbell, Springfield State Fair meeting expenses .....		1047	16.96
Nov. 20.	L. N. Wiggins, special premiums State Fair offered on certified and marked milk and cream .....		1048	15.00
Nov. 20.	Geo. Caven, mailing reports to members..		1049	40.00
Dec. 23.	Elgin Dairy Report, 1,000 programs, 1,000 entry blanks, 1,000 posters .....		1050	61.25
Dec. 23.	H. J. Youngs, expenses Joliet convention..		1051	13.24
1908.				
Jan. 27.	O. C. Gregg, balance expenses Marengo..		1052	17.12
Jan. 27.	E. G. Hastings, expenses bacteriological examination of milk at Marengo meeting..		1053	7.28
Jan. 27.	Helmer Rabild, expenses Marengo convention .....		1054	19.04

1908.	To Whom Paid.	Object.	Voucher No.	Amount.
Jan. 27.	Hugh G. Van Pelt, expenses Marengo convention .....		1055	43.42
Jan. 27.	Geraghty & Co., badges Marengo convention .....		1056	49.50
Jan. 27.	Geo. Caven, second half salary, 1907-1908..		1057	100.00
Feb. 4.	George E. Waterman, prorata premium ...		1058	9.00
Feb. 4.	R. A. Wilson, prorata premium .....		1059	6.00
			1060-1	VOID
Feb. 4.	Otto Mayer, prorata \$6 butter \$2.75.....		1062	8.75
			1063	VOID
Feb. 4.	Louis Neilson, prorata \$14 butter \$5.50....		1064	19.50
Feb. 4.	D. C. Benton, prorata \$9 butter \$5.50.....		1065	14.50
Feb. 4.	Wm. Englebrecht, prorata .....		1066	2.00
Feb. 4.	B. M. Campbell, prorata \$9 butter \$5.50 less \$1.00 membership .....		1067	13.50
Feb. 5.	Geo. W. Hoppensteadt, prorata \$4 butter \$5.50 .....		1068	\$9.50
Feb. 5.	F. E. Butler, prorata \$6 butter \$5.50.....		1069	11.50
Feb. 5.	Chris. Larsen, prorata \$10 butter \$5.50....		1070	15.00
Feb. 5.	R. J. Koepsell, prorata .....		1071	16.00
Feb. 5.	A. F. Krueger, prorata \$2 butter \$5.50....		1072	7.50
Feb. 5.	Otis C. Murray, prorata \$3 butter \$5.50....		1073	8.50
Feb. 5.	Fred J. Weddig, prorata \$6 butter \$5.50....		1074	11.50
Feb. 5.	Robt. Moren, prorata .....		1075	5.00
Feb. 5.	Geo. Deardorf, prorata \$8 butter \$5.50....		1076	13.50
Feb. 5.	C. Long, prorata \$12 butter \$2.75.....		1077	14.75
Feb. 5.	Geo. A. Cutler, prorata \$9 butter \$8.25....		1078	17.25
Feb. 5.	E. M. Lamos, prorata .....		1079	2.00
Feb. 5.	Geo. Simonson, prorata .....		1080	9.00
Feb. 5.	J. W. Rhuby, prorata \$6 butter \$5.50.....		1081	11.50
Feb. 5.	Frank E. Rawson, prorata .....		1082	8.00
Feb. 5.	A. J. Salley, prorata \$7 butter \$2.75.....		1083	9.75
Feb. 5.	Alice M. Cooksley, prorata \$7 butter \$2.75.		1084	9.75
Feb. 5.	Eli I. Crocier, prorata \$6 butter \$1.35....		1085	7.35
			1086	VOID
Feb. 5.	Chas. Foss, prorata .....		1087	8.00
Feb. 5.	A. B. Thompson, prorata \$10, 1st cream \$6.00; 2nd milk \$4.00 .....		1088	20.00
Feb. 5.	R. H. Pennington, prorata \$9 butter \$1.35..		1089	10.35
			1090	LOST
Feb. 5.	K. B. Carpenter, butter.....		1091	5.50
Feb. 5.	L. L. Murphy, butter.....		1092	2.75
Feb. 5.	J. G. Goeller, butter .....		1093	5.50
Feb. 5.	H. G. Frazen, butter .....		1094	8.25
Feb. 5.	Wm. Pearson, butter.....		1095	1.30
Feb. 5.	J. F. DeArmond, 1st prize milk.....		1096	6.00



1908.	To Whom Paid.	Object	Voucher No.	Amount.
Feb. 5.	L. E. Coleman, 3rd prize	\$3 milk; 2nd prize cream, \$4 .....	1097	7.00
Feb. 5.	J. F. Sanman, 4th prize milk.....		1098	2.00
Feb. 5.	J. R. Bidduiph, 1st f. c. cheese \$8; 1st, 2nd Sage cheese expenses \$5 less \$1.00....		1099	11.00
Feb. 5.	L. N. Wiggins, expenses Marengo .....		1100	18.90
Feb. 5.	J. G. Lumbard, expenses Marengo .....		1101	20.00
Feb. 5.	Geo. W. Ingersoll, printing .....		1102	11.25
Feb. 5.	Chicago Produce Co., electrotypes for report \$23. Tel. 50c stenographer at Marengo, \$10.50; expenses 70c.....		1103	34.70
Feb. 12.	C. C. Hayden, Marengo expenses .....		1104	8.06
Feb. 12.	Wm. G. Norstrom & Co., medals State Fair prizes .....		1105	21.00
Feb. 17.	Frank M. Chase, testing herd for Marengo convention .....		1106	20.80
Feb. 17.	J. P. Mason, expenses Springfield and Marengo .....		1107	23.50
Feb. 20.	Lowrie & Black, printing 3,000 reports, \$694.00; freight, \$16.22 .....		1108	710.72
Mar. 30.	Geo. W. Ingersoll, stationery for officers and directors .....		1109	9.75
Mar. 30.	W. J. Fraser, expenses Havanna and Washington .....		1110	7.67
Mar. 30.	A. J. Jansen, expenses Marengo, \$13.50; Peoria \$10.75; Effingham \$4.50 .....		1111	28.75
Mar. 30.	Geo. Caven, expenses self and part expenses speakers for Havanna, Washington, Highland and Effingham .....		1112	61.43
Mar. 30.	J. P. Mason, expenses Effingham meeting .....		1113	10.75
			1114	VOID
Apr. 18.	J. F. Sanmann, Peoria, Springfield and Havanna .....		1115	7.50
Apr. 18.	C. E. Lee, expenses Havanna, Washington, Highland and Effingham .....		1116	23.27
Apr. 18.	C. C. Hayden, expenses Havanna, Washington, Highland and Effingham .....		1117	11.96
Apr. 18.	O. C. Gregg, expenses Marengo meeting...		1118	5.00
Apr. 18.	A. F. Jansen, expenses Effingham meeting..		1119	8.00
			1120	not in
			1121	not in
Apr. 18.	Joseph Morris, expenses Washington meeting .....		1122	8.00
May 29.	Mary M. Carpenter, stenographic report Marengo meeting .....		1123	75.00
Total .....				\$2,297.03

## RECEIPTS.

1907.

Aug. 1.	Balance on hand .....	\$38.84
	Received from Geo. Caven .....	512.91
Oct. 5.	Received from State .....	2,500.00

Total .....\$3,051.75

Total disbursements to July 1,  
1908 .....\$2,297.03

Balance on hand as per bank  
book July 1, 1908 ..... \$754.72

Approved August 14, 1908.

L. N. WIGGINS,

M. S. CAMPBELL.

The Treasurer's report shows a balance of \$754.72, but there were outstanding orders not yet presented, amounting to \$100.33 and several orders issued after July 1, 1908 to cover expenses of the year, amounting to \$47.16 or a total of \$147.49 which does not appear in the treasurer's report. These orders will reduce the balance to \$607.23.

The last year was the first for the association under the additional \$1,000 appropriation from the state and in the new work the association undertook in its auxiliary meetings, was an experimental year. The meetings held were conducted as economically as possible, the desire being to keep well within the appropriation. The showing made convinces the officers that, in view of the association's receipts from memberships, advertising, etc., the new work can be done on broader lines without the danger of exceeding the association's funds.

GEO. CAVEN, Secretary.

# NEW TABLE THAT ANSWERS THE GREAT ECONOMIC QUESTIONS ABOUT THE INDIVIDUAL COWS IN ANY HERD, AND HOW TO USE IT.

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By

WILBER J. FRASER.

Chief in Dairy Husbandry, and Published by Illinois Experiment Station.

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How much is this cow worth? And that one?

How much milk and how much butter fat does she produce per year?

What profit will she return each year?

What is the cost of her feed for one year? Of the labor?

What are the other expenses and depreciation?

What is the value per year of the skim milk? Of the manure?

Will the skim milk, calf and manure pay all expenses except feed?

These are vital questions (financially) for every dairyman, concerning every individual cow in his herd. If he will answer the second question, the table on pages 328-31 will answer the other nine. It is a ready reckoner of cow economics.

The efficient cow is the chief factor in making money on a dairy farm. Good dairying is one of the most remunerative lines of farming, and for this reason even poor, unbusiness-like dairying may result in some gain. As a rule the average, or even the best dairymen, neither know nor suspect the extent to which the profit or loss from each individual cow affects the profit received from the whole herd. The profit on the good cows covers up the loss on the poor ones, and thus the owner fails to see how easily

and to what extent the profits could be increased by simply disposing of a few poor cows. If the largest returns are to be obtained, it is necessary to weed out the unprofitable cows from the herd. This testing and weeding out of the unprofitable cows has been advocated for several years. Test associations for this purpose have been recently started in all the most prominent dairy countries of the world. Hoard's Dairyman, through its valuable cow census work, has shown clearly that many herds in different sections of the United States are kept at an actual loss. The Department of Dairy Husbandry at the University of Illinois has published no less than ten bulletins and circulars on this subject in the past five years. But for all that, both the dairymen and the public have not realized the full significance of this work. The reason so many herds are kept at an actual loss or little profit is because a man with a large herd of poor cows may receive a large check at the end of each month, but he does not see the large expense bill that must be subtracted from this. The total receipts must not be looked upon as the net profit.

In an attempt to bring out these facts more clearly, and to save the dairymen much figuring, the following table has been worked out. This table is based on the experience and findings of the Department of Dairy Husbandry during the past thirteen years. To illustrate the use and value of this table, it is here applied to the yearly records of the individual cows of five herds taken from the many herds which have been tested by this department.

This table and its application to herds proves that many men are, twice each day, milking cows that are not paying for the feed they eat. Yet the laborious task is continued, year after year, in the vain attempt to make money with a class of cows utterly unable to return a profit. The game of making money with inefficient cows is absolutely blocked, yet many dairymen are so busy milking these poor cows that their vision is apparently be dimmed, and they cannot see the ultimate outcome. One might as well pay his entry fee and attempt to win a race in the 2:10 class with a draft horse that could not go a mile in five minutes,

as to attempt to make money with some of the cows that are being milked. Just think of the "Wasting of years of weary, unprofitable toil" on our dairy farm in doing all the labor of preparing the ground, planting, cultivating, harvesting and storing the crops, only to dispose of the feed to a dairy herd in which many of the individual cows are kept at an actual loss. All of this waste of labor and energy might easily be obviated if intelligence and common sense were used in establishing and breeding up an efficient dairy herd. To present and impress the facts of profit and loss in the herds as they are today, is the object of this table and its application.

### How to Use the Table.

This table shows how the profit differs with cows differing in production from 2,000 to 15,000 pounds of milk per year. There is a column of figures for each increase of 250 pounds of milk. To find the profit or loss of any individual cow, it is only necessary to follow line 4 to the column having the number of pounds of milk nearest to the production of the cow; run down the column to line 17, and note these. Begin again on line 18, following it to the figures that correspond the nearest to the pounds of butter fat produced by the cow; go down this column to line 21. The sum of these two amounts gives the total year's profit or loss from the cow. The reason that the cost of feed should be based on the figures found in the column with the butter fat and not in the column with the milk, is because cows producing rich milk require more feed per hundred pounds of milk than cows testing low in butter fat.

As an example of how to use Table 1, the returns from the first cow in herd No. 1 are here figured. She produced 4,191 pounds of milk and 122 pounds of butter fat. In line 4 find the number of pounds of milk nearest that produced by the cow, which in this case is 4,250. Follow down this column to line 17, to the figures which read \$3.99. Beginning again on line 18, follow it to the figures that correspond the nearest to the pounds of butter fat produced by the cow, which in this case are 120.

Table 1.—Based on Averages from Classes of Cows of Different Production, Considering Their Value, Production, the Cost of Keep and Income from Products.

1. Value of cow at first freshening . . . . .	\$30 00				\$35 00				\$40 00				\$45 00	
2. Value of cow for beef at end of life . . . . .	30 00				23 00				27 00				25 00	
3. Difference, or depreciation during life . . . . .	0 00				6 00				13 00				20 00	
4. Pounds milk produced . . . . .	2000				3000				4000				5000	5250
5. Pounds skim milk, 85 per cent of whole milk . . . . .	1700				2550				3400				4250	
6. Value of skim milk @ 20c. . . . .	\$3 40				\$5 10				\$6 80				\$8 50	
7. Value of Bull . . . . .	\$3 00				\$3 00				\$3 00				\$3 00	
8. Value of Heifer . . . . .	\$3 00				\$3 00				\$3 00				\$3 00	
9. Value of manure at an average price of \$1.50 per ton. . . . .	13 50				14 00				14 50				15 00	
10. Total value of skim milk, calf and manure. . . . .	\$19 90				\$22 10				\$24 80				\$27 50	
11. Cost of labor. . . . .	\$17 00				\$17 50				\$18 00				\$18 50	
12. Interest, taxes, insurance and repairs on barn. . . . .	4 00				4 00				4 00				4 00	
13. Service fee. . . . .	2 00				2 00				2 00				2 00	
14. Interest, depreciation on cow. . . . .	1 50				2 62				3 89				5 15	
15. Veterinary service, medicine, and spraying materials. . . . .	20				30				40				50	
16. Depreciation on dairy utensils. . . . .	60				65				70				75	
17. Total expense of labor, house-keeping, service fee, interest and depreciation on cow and utensils. . . . .	\$25 30				\$27 07				\$28 99				\$30 90	
18. Does skim milk, calf and manure pay labor, interest and depreciation on cow? . . . . .	\$5 40				\$4 97				\$4 19				\$3 40	\$3 13
19. Pounds butter fat in 4 per cent milk. . . . .	80				120				160				200	210
20. Value of butter fat at 27 cents per pound. . . . .	\$21 60				\$32 40				\$43 20				\$54 00	
21. Cost of feed for cow . . . . .	34 00				36 00				38 00				40 00	
22. Profit from butter fat over feed.. . . .	\$12 40				\$3 60				\$5 20				\$14 00	\$16 20
23. Total years profit per cow. . . . .	\$17 80				\$8 57				\$1 01				\$10 60	\$13 07







Table 1.—Continued.—Based on Averages from Classes of Cows of Different Production, Considering their Value, Production, the Cost of Keep and Income from Products.

1.	Value of cow at first freshening .			\$120 00						\$130 00				\$140 00
2.	Value of cow for beef at end of life . . . . .			25 00						25 00				25 00
3.	Difference, or depreciation during life . . . . .			95 00						105 00				115 00
4.	Pounds milk produced . . . . .			13000						14000				15000
5.	Pounds skim milk, 85 per cent of whole milk . . . . .			11050						11900				12750
6.	Value of skim milk @ 20c. . . . .			\$22 10						\$23 80				\$25 50
7.	Value of Bull { each calf { Heifer { Average. 29 / 29 / 29 / 29 /			\$29 00						\$34 00				\$40 00
8.	Value of manure at an average price of \$1.50 per ton. . . . .			19 00						19 50				20 00
9.	Total value of skim milk, calf and manure. . . . .			\$70 10						\$77 30				\$85 50
10.	Cost of labor. . . . .			\$25 00						\$26 00				\$27 00
11.	Interest, taxes, insurance and repairs on barn. . . . .			4 00						4 00				4 00
12.	Service fee. . . . .			2 00						2 00				2 00
13.	Interest, depreciation on cow. . . . .			19 85						21 61				23 77
14.	Veterinary service, medicine, and spraying materials. . . . .			1 30						1 40				1 50
15.	Depreciation on dairy utensils. . . . .			1 05						1 20				1 25
16.	Total expense of labor, housing, service fee, interest and depreciation on cow and utensils. . . . .			\$53 30						\$56 21				\$59 52
17.	Does skim milk, calf and manure pay labor, interest and depreciation on cow? . . . . .			\$16 80						\$21 09				\$25 98
18.	Pounds butter fat in 4 per cent milk. . . . .			520						560				600
19.	Value of butter fat at 27 cents per pound. . . . .			\$140 40						\$151 20				\$162 00
20.	Cost of feed for cow . . . . .			56 00						58 00				70 00
21.	Profit from butter fat over feed..			\$84 40						\$93 20				\$102 00
22.	Total year's profit per cow. . . . .			\$101 20						\$114 29				\$127 98

Go down the column to line 21 and find the next figures, \$3.60. The sum of these two amounts—3.99 and 3.66 is \$7.59, the total year's loss from this cow.

As a second example, the last cow in herd No. 1 gave 6.665 pounds of milk and 276 pounds of butter fat. Her milk production places her in the column headed 6,750 pounds of milk, resulting at a loss of \$1.90, line 17. Her production of butter fat—276 pounds—places her in the 280-pound class, showing a profit of butter fat over feed of \$31.60, line 21. The sum of this \$31.60 and the —\$1.90 previously found in line 17, is \$29.70—the total year's profit for this cow.

### Detailed Explanation of Table.

These figures in Table 1 are based upon conditions as they exist today, which in many cases are far below the ideal.

The price for the product is considered at the market value of butter fat at the creamery, and this price should be obtained by any dairyman in the state, no matter what his location. If the milk were shipped to a city for direct consumption, retailed directly to the consumer, or cream sold for a fancy trade, the returns would be much greater than indicated in the table.

The production per cow is the average for six years,—the length of time cows are milked in most herds. Although some cows produce for twice this length of time, there are also many which drop out after only one or two years' production.

1.\* The value of the cows producing the different yields is estimated as nearly as possible at their actual market price. Cows producing 2,000 pounds of milk are valued at \$30, and their value increases \$5 for every additional thousand pounds produced up to 6,000 pounds; above this, \$10 for every thousand pounds' increase in production.

2. The value of cows when disposed of is estimated at \$30 for cows producing 2,000 pounds of milk, and this price decreases to \$25 for cows giving 5,000 pounds of milk and above.

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\*Paragraph numbers correspond with line number of the table.

5. The amount of skim milk is figured as 85 per cent of the whole milk, as this is the amount returned from creameries or obtained from the hand separator on the farm.

6. Skim milk is valued at 20 cents per hundred pounds, since the best data shows that it requires an average of 5 pounds of skim milk to equal one pound of grain in pork production. When grain is worth one cent a pound, or \$1 per hundred pounds, skim milk would be worth 20 cents per hundred pounds. If the skim milk is fed to heifer calves of good quality, the value will vary from 20 cents to \$1.00 per hundred pounds, depending upon the conditions and the quality of the calves.

7. Calves from cows producing less than 5,000 pounds of milk annually are considered at veal prices only, and are valued at \$3 when five days old, when the milk of the dam is fit for use. From cows producing more than 5,000 pounds of milk annually, the value of the heifer calves increases more rapidly, as the dams are more efficient producers. Bull calves are not considered of value except for veal, unless they are from cows producing an average of 10,000 pounds of milk annually, in which case their value is placed at \$16, and this value increases at the same rate as the heifers from higher producing dams. The question may rightly be raised if bulls from grade cows should be used for service. It would be better not to do so, unless it is known that the dams were, for at least two generations, good producers, but at the present stage of dairy cattle breeding in the United States, bull calves from cows producing an average of 10,000 pounds of milk for six years would be of service in increasing the production of our future dairy cows. In fact, it is by this method that the dairy cattle of Denmark have been so markedly improved in the last 25 years.

8. The manure is figured at 11 tons per head for cows producing 8,000 pounds of milk. On the twenty-acre dairy farm at the University last year, cows which were kept in the barn during the winter, and in a dry lot during the summer, produced 13 tons of manure per cow. The average value is considered at \$1.50 per ton. At the Illinois Agricultural Experiment Station, on a

three-year rotation of corn, oats and clover, manure has increased the crop yield \$1.60 for each ton of manure used, figuring the market value of the crops for the first three years after it is applied. No consideration is taken of the increased production from the effects of the manure after the first three years. At the Ohio Experiment Station, the value of the crop yields has been increased \$2.34 for each ton of manure used. From the figures above stated, \$1.50 a ton is a conservative value on cow manure which has been well cared for. Cows which produce less than 8,000 pounds of milk will produce, on the average, less than 11 tons of manure. Cows producing more than 8,000 pounds of milk will not only produce more manure, but it will be of better quality, owing to the fact that they are fed more concentrates. For these reasons, the value of the manure is lowered by 50 cents per cow for every 1,000 pounds' decrease in production of milk below 8,000 pounds, and raised 50 cents per 1,000 pounds' increase in production above 8,000 pounds.

10. The labor per cow at the dairy of the University of Illinois has amounted to \$22, where the cows were stabled continually throughout the year. This is more, decidedly, than it will cost under the ordinary farmers' conditions, hence \$20 is taken as a basis for labor on cows producing 8,000 pounds of milk annually. The labor for cows producing less than 8,000 pounds of milk will not depreciate materially, as feeding, watering, cleaning stables and caring for the individual cows will be practically the same, regardless of their production, and cows giving less milk will be much slower milkers, thus requiring more time per pound of milk obtained. The labor is reduced only 50 cents for every thousand pounds' decrease in milk production below 8,000 pounds, making a minimum cost of labor on a cow producing 2,000 pounds of milk, \$17. With increased production, only a small amount of extra labor is required in caring for the cows, and as large producers give down their milk more freely, less time is consumed per pound of milk in milking, and one dollar is added to the cost of labor for each 1,000 pounds' increase in yield.

11. The average barn for a herd of 40 cows is worth \$2,000, or \$50 per cow. The interest on this, per cow, would amount to \$2.50 a year, and taxes, insurance, repairs and depreciation will amount to \$1.50 a year, making a total cost per cow for buildings and their maintenance of \$4 per year.

12. The total annual expense of keeping a good pure-bred sire, including feed, care and depreciation is \$75. In a herd of 40 cows, \$2 per cow must be allowed annually, to have each calf sired by a pure-bred.\* Since this amount is so small, every dairyman should keep a good pure-bred sire, even though he has but a small number of good cows in his herd.

13. On the average, cows will be kept in dairy herds for six years, therefore the annual depreciation on the cow is figured as one-sixth of the difference between the value at the time of first freshening and the value when disposed of. To this must be added the interest on the value of the cow each year.

14. Spraying materials, medicine and veterinary service are estimated at 10 cents per 1,000 pounds of milk produced. While the relative increase is rapid, it is true that the large producers are the ones requiring more medical attention, and cows producing only 2,000 or 3,000 pounds of milk in a year need little, if any, of this expenditure.

15. The expense for dairy utensils, if the milk is taken to a condensing factory, bottling plant, or creamery, should be about 90 cents for a cow producing 8,000 pounds of milk. If the milk is separated on the farm, fewer cans are required and less expense is involved in hauling the milk, but, to offset this, there is an additional outlay for a cream separator. If the milk is shipped to a large city, it is necessary to have five sets of cans, which, being badly handled and frequently lost, makes the expense for cans heavy. However, as the milk is sold by measure, it has been found by actual practice that the denting of the cans soon makes them hold enough less milk to compensate for the wear, tear and loss on cans. Since the cost of utensils will depend somewhat upon the amount of milk handled, an allowance of 5 cents per 1,000 pounds of milk produced is made.

\*For details of computation, see *Illinois Experiment Station Circular No. 118*

17. To determine when the value of skim milk, calf and manure will pay for the labor, housing, service fee, interest and depreciation on cow and dairy utensils, compare the upper and lower figures in light bold-face type. The difference between these is shown by the upper line of figures in large black type. From these, it can be seen that in the case of the cows producing less than 9,000 pounds of milk, the skim milk, calf and manure do not pay for the labor, housing, service fee and depreciation on cows and utensils, while with cows producing more than this amount, these returns are so much greater that there is a rapid rise in profit as the production increases.

18. To obtain the final results of profit or loss per cow, the milk, to be as near the average for all breeds as possible, is considered to contain 4 per cent butter fat, which is the average of the 1,200 cows tested by this station. In applying the table to a herd, computations for each individual cow must be made, depending upon the total amount of butter fat in her milk.

19. The value of the butter fat is based upon the Elgin prices for butter during the years 1907 and 1908, which averaged slightly above 27 cents. The overrun, which is the amount of butter made above the amount of butter fat, is allowed for the expense of making the butter.

20. The cost of feed per cow is based on the prices of feed for the past two years, which is decidedly higher than formerly. The cost of feed is raised \$2 for each 1,000 pounds' increase in production of milk. This increase is based upon a large number of yearly records kept at the University of Illinois, where an accurate account is kept of all feed consumed and milk and butter fat produced for the entire year, on cows that vary in production from 2,000 to 15,000 pounds of milk annually. Too much emphasis cannot be placed upon the fact that the milk is made more economically by the higher producers, as they are far more efficient cows.

21. The profit from the butter fat over the cost of feed is shown by the figures in line 21. The total year's profit for the cow is obtained by adding the profit from butter fat over feed

(line 21) and the profit of skim milk, calf and manure over the cost of labor, housing, depreciation, etc., (line 17.) This gives the final account of where the cow stands with the dairyman, and is shown by the figures in line 22. This last line of figures shows clearly the great folly and waste of time and labor in keeping poor producers, and, in striking contrast to this, the profit derived from keeping good producers.

Table 1 may safely be used as an index to the profits, because under existing conditions nearly all herds contain individual cows of vastly different production. On the majority of dairy farms in the extensive dairy region of Illinois, all cows in milk are fed practically alike as to grain, regardless of their production, and their being in the same herd, the cost of all items for the different cows will be nearly the same. Under these conditions the actual difference in profit between the good and poor cows will be even greater than the table indicates.

These figures are based upon definite data worked out at the Experiment Station, but the results will fluctuate slightly, according to the way the herds are fed. The price of feed varies in different years, but as a rule the price of the product varies with the feed, so that this fluctuation is small. When a dairyman uses this table, the question is not whether the results obtained are absolutely correct to a few cents, as it makes no special difference to a farmer whether a cow brought in a profit of \$10 or \$10.50, but it does make an enormous difference whether she lost him \$5, or made him \$20, as may be easily done by ordinary cows producing within the range of many cows in the average herd.

Economic conditions are not the same in different parts of the country, and while this table is made to apply especially to the Central West, it should be found applicable to the entire country. In the eastern part of the United States, feed is higher, and it will cost more to keep a cow a year than in the Central West, but the value of the product is also greater, while in the West the cost of keep will be less than in Illinois, but the receipts for the product will also be less. For these reasons the application of the table should be a good guide in any part of the country, and

its object accomplished, as it is designed to show, in the most striking manner possible, the difference between good and poor herds for the purpose of making money.

To illustrate the use of Table 1 and to show what is the trouble with many of the dairymen, and how the difficulty may be remedied, the profit, based upon the actual production of five herds which have been tested for an entire year by this department, has been figured out according to Table 1.

The following tables are not merely a lot of cow records, but the results in black faced type are interpretations of cow records in terms of profit and loss. The results speak largely for themselves, but a brief discussion follows each herd.

While there are only three unprofitable cows in this herd, such a small number of those on the profitable side of the account net so small a return that the average for the entire herd—\$11.18—is far below the returns that should be expected from a good dairy herd. Just six cows of this herd return the profit that should be expected of a good dairy cow. No cow producing less than \$16 profit a year should be retained. Had this herd consisted of 10 cows like the best one, the owner would have made more profit than with the present herd of 24 cows, and had the whole herd been as good as the best individual, the profit would have been practically \$710, or nearly three times as much as that actually received. Such a change would be a stroke of business worth while.

Herd No. 2 is composed largely of grade cows, of which but six had a predominance of dairy blood. Its most striking feature is that the entire herd of 34 cows brought in a profit of only \$65, or an average of \$1.91 per cow, whereas had the owner disposed of the 15 cows which lost him money, he would have made over \$166, and would not only have been relieved of all the labor of raising the feed, housing, feeding and milking 15 cows, but would also have increased his actual profits by over \$101. To meet this loss it required more than the profit of the first 15 cows on the credit side of the account. In other words, he milked 30



Table 2.—Herd No. 1.

NO. COW	AGE	LB. MILK	LB. FAT	PER CENT FAT	PROFIT	LOSS
1	3	4191	122	2.91		\$7.59
2	2	3441	126	3.66		5.98
3	3	3869	126	3.51		3.58
4	3	4255	158	3.71	\$1.21	
5	3	4594	165	3.60	3.61	
6	3	4613	176	3.81	5.81	
7	3	4857	176	3.62	6.00	
8	3	4551	177	3.88	5.81	
9	6	5019	185	3.68	6.20	
10	3	5617	185	3.29	6.73	
11	8	4833	186	3.84	8.20	
12	3	5537	194	3.48	8.93	
13	3	5892	202	3.42	11.66	
14	3	4494	209	4.65	12.41	
15	3	5621	211	3.75	13.33	
16	8	6510	211	3.24	14.16	
17	3	6661	211	3.16	14.30	
18	3	5631	215	3.82	15.80	
19	5	7438	238	3.20	21.35	
20	10	6639	244	3.69	20.90	
21	10	6525	259	3.98	25.16	
22	10	9092	260	2.86	26.67	
23	11	7036	265	3.76	27.65	
24	4	6665	276	4.29	29.70	
					\$285.59	\$17.15
					17.15	
					\$268.44	
AV.		5565	199	3.57	\$11.18	

Difference in profit between best and poorest cows, \$37.29.

cows for nothing and *would have made more money had he milked but his four best ones*—the only ones that come up to the standard a dairyman should have. The observance of such points as this rates the business ability of the dairyman and proves how essential it is that he should know just what each cow is doing, and dispose of all unprofitable members of the herd.

Table 3.—Herd No. 2.

NO. COW	AGE	LB. MILK	LB. FAT	PER CENT FAT	PROFIT	LOSS
1	3	2496	102	4.09		\$13.18
2	5	3158	107	3.39		10.57
3	13	3369	110	3.27		10.57
4	7	4178	121	2.90		7.59
5	3	3389	123	3.63		8.18
6	15	3349	121	3.70		8.37
7	3	3036	124	4.08		8.57
8	6	3415	125	3.66		5.98
9	6	3947	128	3.24		5.59
10	8	3438	132	3.84		5.98
11	3	3263	133	4.08		6.17
12	8	3435	134	3.90		5.98
13	3	3547	145	4.09		1.58
14	8	3686	149	4.04		1.38
15	3	2429	151	6.22		2.18
16	8	3922	157	4.00	\$1.01	
17	4	3612	158	4.37	.62	
18	8	4185	158	3.78	1.21	
19	8	4296	161	3.75	1.21	
20	1	4328	168	3.88	3.41	
21	6	4131	170	4.12	3.41	
22	11	4290	175	4.08	5.61	
23	7	4528	181	4.00	5.81	
24	8	4458	182	4.08	5.81	
25	9	5014	184	3.67	6.20	
26	7	5191	195	3.76	10.87	
27	12	5403	196	3.63	11.13	
28	7	5673	200	3.53	11.40	
29	8	5333	211	3.96	13.07	
30	4	5215	213	4.08	13.07	
31	9	5820	218	3.75	15.80	
32	6	5953	221	3.71	16.06	
33	5	5822	227	3.90	18.00	
34	8	6606	254	3.84	22.96	
					\$166.66	\$101.87
					101.87	
					\$64.79	
AV.		4233	163	3.85	\$1.91	

Difference in profit between best and poorest cow, \$36.14

Table 4.—Herd No. 3.

No. Cow	Age	Lb. Milk	Lb. Fat	Per Cent Fat	Profit	Loss
1	7	6921	220	3.18	\$ 16.65	
2	3	5380	223	4.14	15.53	
3	4	5432	223	4.10	15.53	
4	5	6652	226	3.40	18.70	
5	6	7461	227	3.04	19.15	
6	7	7272	235	3.23	19.00	
7	5	6664	237	3.55	20.90	
8	8	7027	240	3.41	21.05	
9	7	6512	263	4.04	25.16	
10	6	8087	264	3.26	26.04	
11	5	7449	278	3.73	30.15	
12	5	7051	289	4.09	32.05	
					\$ 259.91	
Av.		6826	244	3.57	\$ 21.66	

Difference in profit between best and poorest cow, \$16.52.

The notable features of this herd are that there are no cows on the losing side of the account, and that the poorest cow made a profit of over \$15, which is more than that of the best cow in many herds. While this herd contains no remarkably profitable cows, the best returning but \$32, as a whole the average profit—\$21.66 per cow—is good because no individuals were kept at a loss to reduce the profits. The total absence of unprofitable cows in the above herd speaks well for the manager's ability as a business dairyman. With more herds like this, there would be a larger number of contented dairy farmers.

This herd of 15 cows is phenomenal in the proportion of cows on the losing side of the account, and also in the excessive loss on many of them. Either one of the two poorest cows lost the owner almost as much money as was made by all the cows on the credit side of the account.

The inference might be that the cost of feed in Table 1 is too high for this herd, but the actual fact is that some of these cows were fed as much as ten pounds of grain per day, during the winter.

Table 5.—Herd No. 4.

Cow No.	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1		1204	49	4.07		\$ 27.52
2		1236	50	4.05		27.20
3		2944	88	2.99		15.17
4		2597	91	3.50		15.38
5		2548	98	3.85		13.18
6		2475	99	4.00		13.18
7		2569	105	4.09		10.98
8		3164	117	3.70		8.37
9		2829	123	4.34		8.67
10		3380	149	4.41		1.58
11		4582	158	3.45	\$ 1.41	
12		4146	174	4.20	3.41	
13		4103	177	4.31	5.41	
14		4993	191	3.82	8.40	
15		4435	200	4.51	10.21	
					\$28.84	\$ 141.23
						28.84
						\$ 112.39
A v.		3147	124	3.94		\$7 49

Difference in profit between best and poorest cow, \$37.73.

The most striking figure in the above table is the last one in the last column, showing a total loss of \$112, which means that this man received \$112 less for the products from his dairy herd than he would have received had he simply *sold the feed*. It is well, also to note that the profit from the cow is only \$10.21, and that this best cow is indeed absolutely inferior to the poorest cow in many of the herds in the state.

This is a deplorable state of affairs—a man trying to support a family with a herd of cows utterly unable to return a profit. The actual conditions of this man's affairs is shown by the last two columns of the table, and is a forceful answer to the question, "Why test cows?" No man would conduct a losing business when fully aware of what he is doing.

*Poor as this herd is, losing \$112 annually, the owner, by disposing of the poorest two-thirds of his herd, without buying a*

*single cow, might have prevented his loss of \$141, and have changed himself from a cow keeper to a dairyman.*

Table 6.—Herd No. 5.

No. Cow	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1		5986	252	4.20	\$ 22 66	
2		7920	254	3.21	23 84	
3		7600	260	3.42	25 75	
4		7169	293	4.08	32 20	
5		8300	295	3.55	35 00	
6		9010	322	3.58	39 87	
7		9045	333	3.68	42 07	
8		9043	337	3.72	44 27	
9		8877	344	3.87	44 27	
10		9999	348	3.48	53 53	
11		11293	376	3.33	63 99	
12		7632	403	5.28	56 69	
13		10289	422	4 10	69 70	
					\$ 553 84	
Av.		8628	326	3.77	\$ 42 60	

Difference in profit between best and poorest cows, \$47.04.

Here is a herd of high average production. Although a grade herd, its lowest cow returned a profit of over \$22, which is more than twice that of the best cow in the poorest herd (No. 5.) The difference between the individuals of the herd is large, but the star boarders were long ago eliminated, as a result of several years' work keeping individual production records of the cows and replenishing the herd by using a good pure-bred sire and raising the heifers from the best cows.

On only 96 acres of land, with practically no expense for purchased cows or feed, the owner is making with this herd a comfortable living for himself and family. He is an enthusiast instead of a plodder, reads dairy literature, turns drudgery to pleasure, and has time and money for the better things of life. He receives pay not only for his manual labor, but the neat little sum of \$556 as a clear profit, to compensate for his head work.

### Conclusion.

The returns from cows, when expressed in dollars and cents, stand out much more vividly than they do when expressed in pounds of milk and butter fat. Therefore, if every dairyman would keep a yearly record of the amount of milk and butter fat produced by his individual cows, and from this calculate, according to Table 1, the profit or loss on the individuals, he would be astonished at the wide variation in earning capacity of the different cows in the herd, and the results would be of untold value to him. When the herds themselves are given like consideration, a notable contrast in the variation in earning capacity of the herds is brought out.

The cows in herd No. 4 lacked \$7.48 each of paying for their feed and care, while each cow in herd No. 5 made a profit of \$42.77, making a difference in income of over \$50 per cow between the two herds. The best cow in the good herd brought in \$69.70 profit, while the poorest cow in the poor herd was kept at a loss of \$27.52, making a difference in the earning power of the two cows of nearly \$100 annually.

Equally surprising facts for the guidance of the dairyman would be brought out were Table 1 applied to many other dairy herds.

## DIRECTORS' MEETING.

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Directors of Illinois State Dairymen's Association met in Rockford during the State Farmers' Institute last February. All the directors were present and the policy and plans of the Association for the year were discussed. The directors approved the plan of holding auxiliary meetings in different sections of the state and each director was asked to interest himself in finding where such meeting could be profitably held.

By unanimous vote of the directors Charles Foss of Cedarville was elected treasurer of the Association, his term of office to begin July 1, 1909, when the next appropriation from the state to the Association becomes available.

By the same vote George Caven, Chicago, was re-elected secretary.

Secretary Caven read a report of his receipts and expenses and the same was accepted and a committee of three members was appointed to audit and approve both the secretary's and treasurer's reports for the year. This committee consisted of the president, L. N. Wiggins of Springfield; E. Sudendorf of Clinton, and Charles Gilkerson of Marengo.

President Wiggins announced that he had selected the following to act as University of Illinois advisory committee from the Association: L. N. Wiggins, Springfield; J. P. Mason, Elgin; Joseph Newman, Elgin; M. S. Campbell, Genoa; Louis Latzer, Highland.

Invitations from Vandalia and Elgin as places for the next annual convention were read and the decision was put off until the meeting at the state fair in October. However, as no annual convention had been held in the southern part of the state for several years, the sentiment as expressed by the directors favored Vandalia for the 1910 meeting.

Adjourned

GEO. CAVEN, Secretary.

## MEMBERSHIP LIST FOR 1908-1909.

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### A

Andrews, P. W., Marengo.	Ardrey, R. G., Oakdale.
Alexander, C. B., Chicago. (Star Union Lines.)	Austin, F. G., Effingham.
Aler, Geo., Rockfeller.	Auten, A. O., Jerseyville.
Adams, A. A., Harvard.	Adams, A. A., Harvard.
A. H. Barber, Creamery Supply Co., Chicago.	Allen, J. J. 215 Jackson Blvd., Chicago.
Adams, Chas. J., Loda.	Am. Milk Prod. Co., Union.

### B

Bean, R. M., Marengo.	D. H. Burrell & Co., Little Falls, N. Y.
Boies, W. A., Marengo.	Baldwin, Geo. H., Mendon.
Jersey Bulletin, Indianapolis.	Baldwin, R. C., Redpath.
Biddulph, J. R., Tiskilwa, R. 1.	Barnhart, Chas., Elwood.
Beaver, G. E., St. Louis.	Becker, W. J., Farina.
Berryman, B. F., Elgin.	Bloomfield, R. A., Mt. Sterling.
Brochers, H. C., 6319 Ellis Ave., Chicago.	Bloyer, Otto, Elkhorn Grove.
Bristol, Geo. S., Plainfield.	Boehmer, H., Barrington.
Benton, D. C., Kaneville.	Bristol, G. S., Plainfield, R. R. 6.
Bloyer, Geo., Savanna.	Buchanan, G. L., Robinson, R. F.
Bereister, Mrs. Wm. C., Zion City.	Bueler, Anton, Bemes.
Burg, Simon, St. Charles.	Burton, G. F., Mt. Carroll.
Bramstedt, Wm., Mascoutah.	Browning, H. A., Elgin.
Blanke and Hauk, St. Louis, Mo.	Butler, F. E., Belvidere.
Baird, F. W., Custer Park.	



## C

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|---|--------------------------------|
| Colton, C. W., Marengo.                     | Causey, J. S., Mulberry Grove. |
| Crissey, A. A., Marengo.                    | Clinger, J. V., Stewardson.    |
| Connett, H. G., Chillicothe.                | Collyer, W. D., Chicago.       |
| Caven, Geo., 154 Lake St., Chicago.         | Cooley, Fred A., Yorktown.     |
| Casey, Wm., Elgin (Worcester Salt Co.)      | Coolidge, J. H., Galesburg.    |
| Crynes, Wm., Chillicothe.                   | Crissey, N. O., Avon.          |
| Campbell, M. S., Genoa.                     | Cutler, F., Lockport.          |
| Crosior, Eli I., Utica.                     | Campbell, B. M., Mascoutah.    |
| Creamery Package Mfg. Co., Chicago.         | Carlyle, Hall, Peoria.         |
| Campbell, A. B., Oregon.                    | Chase, H. A., Harvard.         |
| Carbaugh, Wm. T., Lanark, R. R. 1.          | Claw, A. S., Plainfield.       |
| Carpenter, K. B., Thomson.                  | Clute, Tom, Woodstock.         |
| Clegg, J. F., Chicago (Merrill & Eldredge.) | Coleman, L. E., Belvidere.     |
|   | Coolidge, C., Winnebago.       |
|   | Cutler, Geo. A., Belvidere.    |

## D

- |  |                                  |
|--|----------------------------------|
| Duell, H. R., Savanna.                     | DeLano, H. W., Sugar Grove.      |
| De Laval Separator Co., Chicago.           | Dewey, F. E., Capron.            |
| Diamond Crystal Salt Co., St. Clair, Mich. | Dickinson, F. J., Woodbine.      |
| Davenport, Prof. E., Urbana.               | Dowling, Robt. J., Ontarioville. |
| Davis, S. E., Elgin.                       | Dike, G. H., Marengo.            |

## E

- |                              |                                      |
|------------------------------|--------------------------------------|
| Edmonson, Dr., Clinton.      | Elgin Butter Tub Co., Elgin.         |
| Ehlers, Jno., Altamont.      | Empire Cream Separator Co., Chicago. |
| Engbring, W. H., Effingham.  | Erf, Prof. Oscar, Columbus, Ohio.    |
| Englebrecht, Wm., Fairhaven. |                                      |

## F

- |   |                                     |
|---|-------------------------------------|
| Foss, Chas., Cedarville.                        | Fraser, W. J., Urbana.              |
| Foster, Thos., Springfield (Leland Hotel Farm.) | Fellhoelter, Jos., Effingham, R. 4. |
|   | J. B. Ford Co., Wyandott, Mich.     |

## F

Foster, J. C., Sparta.  
Francis, F., New Lenox.  
Fraser, Prof. W. J., Urbana.  
Fredricks, Andrew, Elgin (DeLaval  
Separator Co.)

Frein, H. P., Smithton.  
Freund, S. H., Johnsbrough.  
Farr, L. M., Elgin.  
Fay, P. W., Marengo.

## G

Goeller, J. G., Tower Hill.  
Green, G. M., Mt. Olive.  
Green, W. J., Welton.  
Green, Wm. M., Lockport.  
Greenwood, H., Joliet.  
Grossman, J. H., Martinville.  
Greenwood, Ivan J., Bristol.  
Grout, A. P., Winchester.  
Gullickson, Martin, Frankfort Sta-  
tion.

Gurler, G. H., DeKalb.  
Gillespie, A. D., Watson.  
Greene, S. F., 7670 Union Ave.,  
Chicago.  
Gillespie, A. D., Watson.  
Gilkerson, Chas., Marengo R 4.  
Gill T. H., Effingham.  
Grimm, Ferdinand, Savanna R 2.  
Gaston, F. L., Normal.  
Gibbon, T. H., Elgin.

## H

Hunt, Wm., Ridott.  
Hertzel, G. W., Effingham.  
Hill, G. C., Baylis.  
Hague, Harry S., German Valley.  
Hoppensteadt, Geo. W., Goodenow.  
Chr Hansen's Laboratory, Little  
Falls, N. Y.  
Hadley, E., Joliet.  
Haley, C. F., Marley.  
Hartman, W. T., Naperville.

Hatch, Fred L., Spring Grove.  
Hayden, C. C., Urbana.  
Heath, G. W., Mason, R. F. D. 1.  
Henry, R. J., Millersburg.  
Herman, Jno., Raymond.  
Hicks, J. E., Thompson.  
Holland, O. E., Warren.  
Horsing, S. S., Stillman Valley.  
Hunt, Geo. A., Hebron.  
Haeger, E. H., Dundee.

## I

International Harvester Co.,  
Chicago.

International Salt Co., Chicago.  
Irish, H. B., Farina.

## J

Jennings, A. A., Chicago (Star Union Lines.)  
 James, W. E., Hinsdale.  
 Jansen, A. F., Effingham, R 3  
 Johnson, Frank, Prophetstown.  
 Jacobson, H., Nokomis.

Jensen, S. M., Orangeville.  
 Johnson, Ernest, Hebron.  
 Jones, A. H., State Food Commissioner, Chicago.  
 Jorgensen, F. A., Urbana.

## K

Kent, Emmett, Clinton.  
 Kendall, George, Mt. Carroll.  
 Kent, A. H., Mulberry Grove.  
 Kirkpatrick, J. R., Oakdale.

Kleckner, H. S., Orangeville.  
 Kolb, John, Elizabetht.  
 Kuobelock, Geo., Marion.  
 Knudson, Wm., Union.

## L

Loy, J. H., Effingham.  
 Lombard, J. G., 6624 Wentworth Ave., Chicago.  
 Lind, Carl, Champaign.  
 Leass, S. L., Sullivan.  
 Lee, Carl E., Madison, Wis.  
 Letts, Geo. D., Frankfort Station.  
 Liell, John M., Edgewood.  
 Lindley, Hon. C. J., Greenville.

Litchardt, Herman, Schaumburg.  
 Lloyd, W. B., Kinmundy.  
 Lohmen, Wm. C., Sorento, R. R. 2.  
 Long, M., Woodstock.  
 Ludwig, Mat., Lockport.  
 Lally, W. A., Chicago (N. Y. Despatch Trans. Co.)  
 Lamos, E. M., Warren.  
 Larsen, Chris., Ontarioville.

## M

McEwen, Chas., Marengo.  
 Mackey, L. E., Marengo.  
 Mallory, E. G., Freeport.  
 Mallatt, A. H., Freeport.  
 McKinney, W. H., Clinton.  
 Mason, J. P. Elgin.  
 Musselman, M. L., Lanark.  
 McCready, A. D., Argyle.  
 Moren, Robt., Morrison.

Murphy, S. L., Garden Plain.  
 Marsey, H. C., Jerseyville.  
 Macey, V. D., Mooresville.  
 Mann, F. J., Gilman.  
 Mantz, L. P., Watson.  
 Maule, A., Shirland.  
 Maurer, W. H., Rock Grove.  
 Mills, Col. Chas., Springfield.  
 Mingle, John, Toledo.

## M

Moles, F. R., Chicago.  
Package Mfg. Co.)  
Metzger, F. L., Millstadt.  
Moore, W. S., Chicago.  
Morris, Jos., Washington.  
Murray, Otis C., Johnsburg.  
Marks, C. W., Pecatonica.  
Marsh, J. N., Huntley.  
Marsh, G. W., Huntley.  
Mayer, Ot'o, Davis.

McCredie, Wm., Elgin.  
McNish, F. J., Chicago (Creamery  
Meyer, Adolph, Greenville.  
Michener, E. P., Chicago (Briggs  
House.)  
McNair, Jos., Winnebago.  
Moren, W. H., Union.  
Morse, F. S., Woodstock.  
Muller, L. Fred., Rockford.  
Murray, Otis C., McHenry.

## N

Newman, Walter, Elgin.  
Newman, Joseph, Elgin.  
Niles, H. B., Decatur.  
Nielsen, Louis, Camp Point.

Newman, J. B., (Asst. State Food  
Commissioner) Elgin.  
Nelson, Peter, Creston.  
Noel, E. C., Elwood.

## O

Olson, Chas., Kirkland.  
Osgood, H. B., Chicago (Creamery  
Package Mfg. Co.)

O'Rourke, D., Union.  
Osborn, J. W., Butler.

## P

Pardom, L. J., Maroa.  
Purvis, J. T., Champaign.  
Peterson, N. A., Sigel.  
Peters, B. K., Dallas City.  
Pennington, R. H., Plainfield.  
Palmer, F. R., Pearl City.  
Patterson, Jno. W., Plainfield.  
Patton, R. A., Hanna City.

Peak, S. W., Winchester.  
Patterson, J. P., Plainfield.  
Pearson, Wm., Elgin, R. No. 4.  
Phillips, Edw., Griggsville.  
Phillips, Louis, Germantown.  
Powell, J. W., Peoria (Merchants'  
Despatch Transportation Co.)  
Pennington, J. S., Plainfield.

## R

Remmington, H. D., Clinton.  
 Rawson, Frank E., Alden.  
 Kayner, J. W., Elgin.  
 Redpath, R. G., Baldwin.  
 Rice, H. B., Lewiston.

Robbins, Wm., Manhattan.  
 Roessler, Theodore, Shelbyville.  
 Rowley, Walter, Lockport.  
 Rawson, F. E., Woodstock, R. No. 3.  
 Rhuby, J. W., Mt. Carroll.

## S

Smith, Warren, Marengo.  
 Sanmann, J. F., Havana.  
 Simonson, Geo., Camp Point.  
 Shaffer, S. D., Waynesville, R. 1.  
 Sudendorf, E. Clinton.  
 Snyder, Chas., Decatur, R. 8.  
 Saunders, Chas., 165 Locust Street,  
 Chicago.  
 Somerfield, S. A., Brandon, Wis.  
 Smith, Jacob, Washington.  
 Schwartz, H. E., Mt. Vernon.  
 Simonson, M., New Berlin.  
 Sprague, C. N., 707 Van Buren St.,  
 Joliet.  
 Spies, L. A., Union Dairy Co., St.  
 Louis, Mo.  
 Sharples Separator Co., Chicago.  
 Sanmann, W. H., Havana.  
 Schildmiller, Jno., Thomson.  
 Schlattman, Fred., St. Libory.  
 Schuknecht, H. E., La Grange.

Schwartz, Ed., Damascus.  
 Scott, J. E., Scales Mound.  
 Shilling, S. B., Mason City, Iowa.  
 Sloggett, John, Hinckley.  
 Slouborg, Thos., Savana.  
 Smith, Andrew, Washington.  
 Smith, D. C., Lake Zurich.  
 Spanger, E. E., Big Rock.  
 Sherman, W. H., Belvidere.  
 Smith, Andrew, Washington.  
 Spies, L. A., St. Jacob.  
 Sprague, C. N., Joliet.  
 Spencer, C. V., Chicago (Santa Fe  
 Railroad.)  
 Storms, H., New Lenox.  
 Salley, A. S., Roscoe.  
 Schnerden, Joe, Union.  
 Stoxen, Henry, Union.  
 Stover, W. J., Chicago, (A. H.  
 Barber Co.)  
 Swail, A. E., Belvidere.

## T

Thompson, A. E., Marengo.  
 Taylor, J. A., Nashville, Tenn.  
 Thewlis, L. L., Wilmington, R. 2.  
 Tatten, Geo. E., Garden Prairie.  
 Thornton, Chas. H., Argyle.  
 Thurston, Henry F., Chicago.

Terpening, J. D., New Lenox.  
 Terry, D. M., Earlville.  
 Tompkins, H. S., Union.  
 Thompson, Frank B., Greenwood.  
 Turner, J. H., Hebron.

## V

Van Kieren, S. J., (National Cream-  
 ery Supply Co.) Chicago.  
 Van Volking, F. P., Danville.

Vermont Farm Machine Co.,  
 Bellows Falls, Vt.  
 Voigt, Chas. H., West Salem.

## W

Waterman, A. G., Marengo.  
 Welch, W. H., Flora.  
 Wellinghoff, E. F., (Creamery  
 Package Mfg. Co., Chicago.)  
 Wachtel, Fred, Schaumway, R. 2.  
 Walmstrom, N. T., Decatur.  
 Wiggins, L. N., Suringfield.  
 Wiggins, L. N., Springfield.  
 Report) Elgin.  
 Willswerth, N. J., (J. B. Ford Co.)  
 Wyandotte, Mich.  
 Woodard, Chas. H., Kaneville.  
 Weckerly, L. R., Dakota.  
 Westphall, J. F., Woodstock, R. 3.  
 Weddige, Fred J., Big Rock.  
 Wilson, R. A., Harvard, R. 1.  
 Worcester Salt Co., Chicago and  
 New York.  
 Wells & Richardson Co., Burling-  
 ton, Vt.  
 Walker, Dr. J. H., Effingham.

Welsh, S. T., Lake Creek.  
 Wentworth, E. M., Davenport, Iowa.  
 (Star Union Lines.)  
 Wilkening, W. C., Schaumberg.  
 Williams, C. H., Chicago (Colonial  
 Salt Co.)  
 Wilson, Chas. G., Martinsville.  
 Wilson, E. L., Manhattan.  
 Wood, D. E. Elgin.  
 Wood, R. L., Woodhull.  
 Woodard, C. H., Big Rock.  
 Woodburg, A. E., Danville.  
 Woolverton D. C., 154 Lake Street,  
 Chicago.  
 Worman, C. A., Ludopton.  
 Wright, F. W., Joslin.  
 Waite, C. M., Belvidere.  
 Waterman, Geo. E., Garden Plain.  
 Weckerly, L. R., Freeport.  
 Wells, F. C., Harvard.  
 Wyman, E. S., Sycamore.

## Y

Young, H. E., (Farmers' Review)      Youngs, H. J., Belvidere.  
 Chicago.

## Z

Zeigler, Jacob, Clinton.

Zeller, Armand, Highland.

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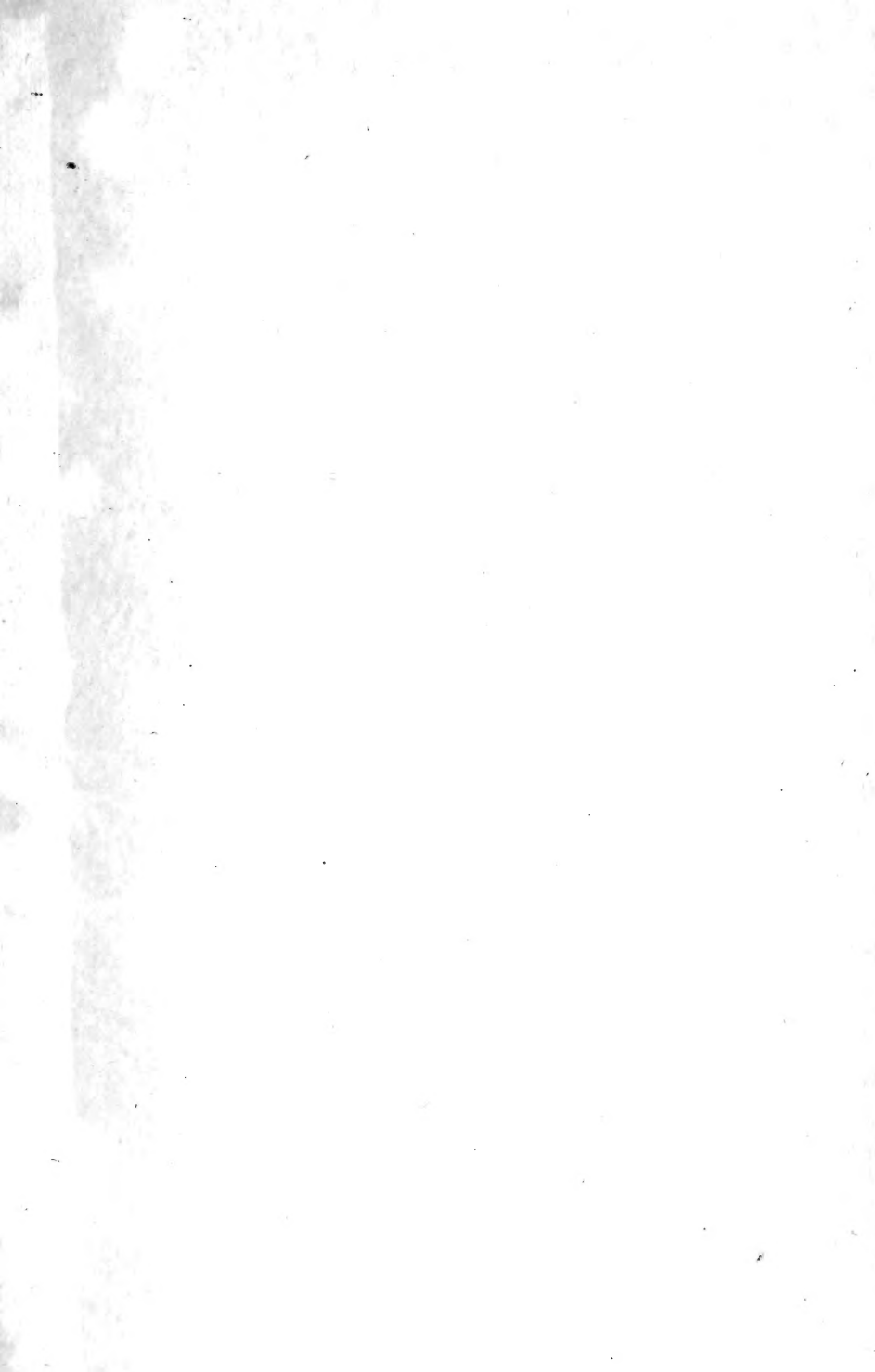
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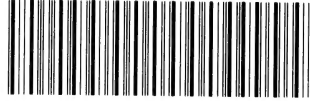








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